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SYLVA SYLVARVM:

OR,

A Naturall Hiſtorie.

IN TEN *CENTVRIES.*

WRITTEN BY THE RIGHT
Honourable FRANCIS LO. *Verulam*
Viſcount S*t*. ALBAN.

Publiſhed after the Authors death,
By WILLIAM RAWLEY *Doctor in Divinitie,*
one of his Majeſties Chaplaines.

Hereunto is now added an Alphabeticall Table of the principall things contained in the whole Worke.

Langley

LONDON,
Printed by *John Haviland* for *William Lee,*
and are to be ſold by *John Williams.* 1635.

TO THE MOST HIGH AND MIGHTY PRINCE CHARLES,

BY THE GRACE OF GOD

King of *Great Britaine, France*, and *Ireland* Defender of the Faith, &c.

May it please your most Excellent Majestie;

THE whole Body of the *Naturall Historie*, either designed or written, by the late *Lord Viscount S. Alban*, was dedicated to your *Maiestie*, in his Booke *De Ventis*, about foure yeeres past, when your *Maiestie* was *Prince*: So as there needed no new Dedication of this *Worke*, but only, in all humblenesse, to let your *Majestie* know, it is yours. It is true, if that *Lord* had lived, your *Maiestie*, ere long, had beene invoked, to the Protection of another

Historie; whereof, not *Natures Kingdome*, as in this, but these of your *Maiesties*, (during the Time and *Raigne* of *King Henry* the *Eighth*) had been the Subiect: Which since it died under the Designation meerly, there is nothing left, but your *Maiesties* Princely Goodnesse, graciously to accept of the Vndertakers Heart, and Intentions; who was willing to have parted, for a while, with his Darling *Philosophie*, that he might have attended your Royall Commandement, in that other *Worke*. Thus much I have beene bold, in all lowlinesse, to represent unto your *Maiestie*, as one that was trusted with his *Lordships Writings*, even to the last. And as this *Worke* affecteth the *Stampe* of your *Maiesties Royall Protection*, to make it more currant to the *World*; So under the *Protection* of this *Worke*, I presume in all humblenesse to approach your *Maiesties* presence, And to offer it up into your *Sacred Hands*.

Your MAIESTIES *most Loyall*

and Devoted Subiect,

W. RAVVLEY.

To the Reader.

HAving had the Honour to bee continually with my *Lord*, in compiling of this *Worke*; And to bee employed there in; I have thought it not amisse, (with his Lordships good leave and liking,) for the better satisfaction of those that shall reade it, to make known somewhat of his Lordships Intentions, touching the Ordering, and Publishing of the same. I have heard his Lordship often say; that if he should have served the glory of his owne Name, hee had beene better not to have published this *Naturall History*: For it may seeme an Indigested Heap of Particulars; And cannot have that Lustre, which Bookes cast into Methods have: But that hee resolved to preferre the good of Men, and that which might best secure it, before any thing that might have Relation to Himselfe. And hee knew well, that there was no other way open, to unloose Mens mindes, being bound; and (as it were)

Maleficiate, by the Charmes of deceiving Notions, and Theories; and thereby made Impotent for Generation of Workes; But onely no where to depart from the Senſe, and cleare experience; But to keepe cloſe to it, eſpecially in the beginning: Beſides, this *Naturall Hiſtory* was a Debt of his, being Deſigned and ſet downe for a third part of the *Inſtauration*. I have alſo heard his Lordſhip diſcourſe, that Men (no doubt) will think many of the *Experiments* conteined in this Collection, to be Vulgar and Triviall: Meane and Sordid; Curious and Fruitleſſe: And therefore he wiſheth, that they would have perpetually before their Eyes, what is now in doing; And the difference betweene this *Naturall Hiſtory*, and others. For thoſe *Naturall Hiſtories*; which are Extant, being gathered for Delight and Vſe, are full of pleaſant Deſcriptions & Pictures; and affect and ſeek after Admiration, Rarities, and Secrets. But contrariwiſe, the Scope which his Lordſhip intendeth, is to write ſuch a *Naturall Hiſtory*, as may be Fundamentall to the Erecting and Building of a true *Philoſophy*: For the Illumination of the *Vnderſtanding*; the Extracting of *Axiomes*; and the producing of many Noble *Works*, & *Effects*. For he hopeth, by this meanes, to acquit himſelfe of that, for which hee taketh *Himſelfe* in a ſort bound;

And

And that is, the Advancement of all Learning and Sciences. For having in this present Work Collected the Materials for the Building; And in his *Novum Organum* (of which his Lordship is yet to publish a Second Part,) set down the Instruments and Directions for the Worke; Men shall now bee wanting to themselves, if they raise not Knowledge to that perfection, whereof the Nature of Mortall men is capable. And in this behalf, I have heard his Lo. speake complainingly; That his Lordship (who thinketh he deserveth to be an Architect in this building) should bee forced to bee a Work-man and a Labourer; And to digge the Clay, and burne the Brick; And more than that, (according to the hard Condition of the *Israelites* at the latter end) to gather the Straw and Stubble, over all the Fields, to burne the Bricks withall. For he knoweth, that except he doe it, nothing will be done: Men are so set to despise the meanes of their owne good. And as for the *Baseneſſe* of many of the Experiments; As long as they be Gods Works, they are honorable enough. And for the *Vulgarnes* of them; true *Axiomes* must be drawne from plain Experience, and not from doubtful; And his Lordships course is to make VVonders Plaine, and not Plaine things Wonders; And that Experience likewise must bee broken and grinded, and not

whole,

whole, or as it groweth. And for *Vse*; his Lordship hath often in his Mouth, the two kindes of *Experiments*; *Experimenta Fructifera*, and *Experimenta Lucifera*: *Experiments of Vse*, and *Experiments of Light*: And he reporteth himselfe, whether hee were not a strange Man, that should thinke that Light hath no Vse, because it hath no Matter. Further his Lordship thought good also, to adde unto many of the *Experiments* themselves, some *Glosse* of the *Causes*; that in the succeeding work of *Interpreting Nature*: and *Framing* of *Axiomes*, all things may be in more readinesse. And for the *Causes* herein by Him assigned; his Lordship perswadeth Himself, they are farr more certaine, than those that are rendred by Others; Not for any Excellencie of his owne Wit, (as his Lordship is wont to say) but in respect of his continuall Conversation with *Nature*; and *Experience*. Hee did consider likewise, that by this addition of *Causes*, mens mindes (which make so much hast to finde out the *Causes* of things,) would not thinke themselves utterly lost, in a vast wood of *Experience*, but stay upon these *Causes*, (such as they are, a litle, till true *Axioms* may be more fully discovered. I have heard his Lordship say also, that one great reason, why he would not put these Particulars into any exact *Method*, (though hee that looketh attentively into

into them, ſhall finde that they have a ſecret Order) was becauſe he conceived that other men would now think that they could do the like; And ſo goe on with a further Collection: which if the *Method* had beene Exact, many would have deſpaired to attaine by Imitation. As for his Lorſhips love of Order, I can referre any Man to his Lordſhips Latine Booke, *De Augmentis Scientiarum*; which (if my Judgement bee any thing) is written in the Exacteſt Order, that know any Writing to bee. I will conclude with an uſuall Speech of his Lordſhips. That this Worke of his *Naturall Hiſtory*, is the *World*, as GOD made it and not as Men have made it; For that it hath nothing of Imagination.

This Epiſtle is the ſame, that ſhould have beene prefixed to this Booke, if his Lordſhip had lived.

W: Rawley.

This Epistle is the Lamp, that should have become preface to this Book, if his Lordship had liv'd.

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FINIS.

NATVRALL HISTORIE.

I. Century.

1 Experiments in *Consort*, touching the Straining and Passing of Bodies, one through another: which they Call *Percolation*.

DIGG a *Pit* upon the *Sea shore*, somewhat aboue the High-water Marke, and sinke it as deepe as the Low-Water Marke; And as the *Tide* commeth in, it will fill with *water*, Fresh and Potable. This is commonly practized upon the Coast of *Barbary*, where other fresh *water* is wanting. And CESAR knew this well, when he was besieged in *Alexandria*: For by Digging of *Pits* in the *Sea shore*, hee did frustrate the Laborious Workes of the Enemies, which had turned the *Sea water* upon the Wells of *Alexandria*; And so saved his Army, being then in Desperation. But *Cæsar* mistooke the Cause, For he thought that all *Sea-Sandes* had Naturall Springs of *Fresh water*. But it is plaine, that it is the *Sea-water*, becaule the Pit filleth according to the Measure of the *Tide*: And the *Sea-water* passing or Strayning through the Sandes, leaueth the Saltnesse.

2 I remember to have Read, that Triall hath beene made of *Salt-water* passed through *Earth*; through Ten Vessells, one within an other, and yet it hath not lost his Saltnesse, as to become potable: But the same Man saith, that (by the Relation of Another,) *Salt water* drained through twenty Vessells, hath become Fresh. This *Experiment* semeth to crosse that other of *Pits*, made by the *Sea side*; And yet put in part, if it be true, that twenty Repetitions do the Effect. But it is worth the Note, how poore the Imitations of Nature are, in Common course of *Experiments*, except they be led by great Iudgement, and some good Light of *Axiomes*. For first, there is no small difference betweene a

Passage

Passage of *water* through twenty small Vessells; And through such a distance, as betweene the Low water and High water Marke. Secondly, there is a great difference betweene Earth and Sand. For all Earth hath in it a kinde of Nitrous Salt, from which Sand is more free: And besides Earth doth not straine the Water so finely, as Sand doth. But there is a Third Point, that I suspect as much, or more than the other Two; And that is, that in the *Experiment* of *Transmission* of the *Sea-water* into the *Pits*, the *water* riseth; But in the *Experiment* of Transmission of the *water* through the Vessells, it falleth: Now certaine it is, that the Salter Part of *Water*, (once Salted throughout) goeth to the Bottome. And therefore no mervaile, if the Draining of *water* by descent, doth not make it fresh: Besides, I doe somewhat doubt, that the vera Dashing of the *Water*, that commeth from the Sea, is more proper to strike of the Salt part, than where the *water* slideth of her owne Motion.

3 It seemeth *Percolation* or *Transmission*, (which is commonly called *Straining*,) is a good kinde of *Separation*, Not onely of Thicke from Thin, and Grosse from Fine; But of more subtile Natures; And varieth according to the Body through which the *Transmission* is made. As if through a wollen Bagg, the Liquour leaveth the Fatnesse; If through Sand, the Saltnesse; &c. They speake of Severing Wine from Water, passing it throug Ivy wood, or through other the like porous Body; But *Non Constat.*

4 The *Gumm* of *Trees* (which wee see to be commonly shining and cleare) is but a fine Passage or *Straining* of the Iuice of the Tree, through the Wood and Barke. And in like manner, *Cornish Diamonds*, and *Rock Rubies*, (which are yet more resplendent than *Gumms*) are the fine Exudations of *Stone*.

5. *Aristotle* giveth the Cause, vainely, why the *Feathers* of *Birds* are of more lively Colours, then the *Haires* of *Beasts*; for no *Beast* hath any fine Azure, or Carnation, or Greene *Haire*. He saith, It is, because *Birds* are more in the Beames of the Sunne, then *Beasts*; But that is manifestly untrue; For *Cattle* are more in the Sun than *Birds*, that live commonly in the Woods, or in some Covert. The true Cause is, that the Excrementious Moisture of living Creatures, which maketh as well the *Feathers* in *Birds*, as the *Haire* in *Beasts*, passeth in *Birds* through a finer and more delicate Strainer, than it doth in *Beastes*: For *Feathers* passe through Quills; And *Haire* through Skin.

6 The *Clarifying* of *Liquors* by Adhesion is an Inward *Percolation*; And is effected, when some Cleaving Body is Mixed and Agitated with the *Liquours*; wherby the grosser Part of the *Liquor* sticks to that Cleaving Body; And so the finer Parts are freed from the Grosser. So the *Apothecaries*. clarify their *Sirrupes* by whites of Eggs, beaten with the Iuices which they would clarify; which Whits of Eggs. gather all the Dreggs and grosser Parts of the Iuice to them; And after the *Sirrup* being set on the Fire, the whites of Egges themselves harden, and are

are taken forth. So *Ippocraſſe* is clarified by mixing with Milke; And ſtirring it about, And then paſſing it through a Woollen Bagge, which they call *Hippocrates Sleeve*, And the Cleaving Nature of the Milke draweth the Powder of the Spices, and Groſſer parts of the *Liquour* to it; And in the paſſage they ſtick upon the Woollen Bagge.

The *Clarifying* of *water*, is an *Experiment* tending to Health; beſides the pleaſure of the Eye, when *water* is Cryſtaline. It is effected by caſting in and placing Pebbles, at the Head of a Current; that the *water* may ſtraine through them. 7.

It may be, *Percolation* doth not onely cauſe Clearneſſe and Splendour, but Sweetneſſe of Savour; For that alſo followeth, as well as Clearenes, when the Finer Parts are ſevered from the Groſſer. So it is found, that the Sweates of Men that have much Heat, and exerciſe much, and have cleane Bodies, and fine Skins, doe ſmell ſweet; As was ſaid of *Alexander*; And we ſee, commonly, that *Gumms* have ſweet Odours. 8

Experiments in Conſort touching *Motion* of *Bodies* upon their *Preſſure*.

TAke a *Glaſſe*, and put *Water* into it, and wet your Finger, and draw it round about the Lip of the Glaſſe, preſſing it ſumewhat hard; And after you have drawne it ſome few times about; it will make the Water friske and ſprinckle vp, in a fine Dew. This *Inſtance* doth excellently Demonſtrate the Force of *Compreſſion* in a Solid Body. For whenſoever a Solid Body (as Wood, Stone, Mettall, &c.) is preſſed, ther is an inward Tumult in the parts thereof, ſeeking to deliver themſelves from the Compreſſion: And this is the Cauſe of all *Violent Motion*. Wherein it is ſtrange in the higheſt Degree, that this *Motion* hath never been obſerved, nor inquired; It being of all *Motions*, the moſt Common, and the Chiefe Roote of all *Mechanicall Operations*. This *Motion* worketh in round at firſt, by way of Proofe, and Search, which way to deliver it ſelfe; And then worketh in Progreſſe, where it findeth the Deliverance eaſieſt. In *Liquors* this *Motion* is viſible: For all Liquours ſtrucken make round Circles, and withall Daſh; but in *Solids*, (which breake not,) it is ſo ſubtile, as it is inviſible; But nevertheleſſe bewrayeth it ſelfe by many effects; as in this *Inſtance* wherof we ſpeake. For the *Preſſure* of the Finger furthered by the wetting (becauſe it ſticketh ſo much the better unto the Lip of the *Glaſſe*,) after ſome continuance, putteth all the ſmall Parts of the *Glaſſe* into worke; that they ſtrike the *water* ſharply; from which *Percuſſion* that Sprinkling commeth. 9

If you ſtrike or pierce a *Solid Body*, that is brittle, as *Glaſſe*, or *Suger*, it breaketh not onely, where the immediat force is; but breaketh all about into ſhivers and fitters; The *Motion*, upon the *Preſſure*, ſearching all wayes; and breaking where it findeth the *Body* weakeſt. 10

The *Powder* in *Shot*, being Dilated into ſuch a *Flame*, as endureth not *compreſſion*; Moveth likewiſe in round, (The *Flame* being in the Natur of a *liquid Body*:) Sometimes recoyling; Sometimes breaking the *Piece*; 11

But

But generally discharging the *Bullet*, because there it findeth easiest Deliverance.

12 This *Motion* upon *Pressure*, and the Reciprocall thereof, which is *Motion* upon *Tensure*; we vse to call (by one common Name) *Motion of Liberty*; which is, when any *Body*, being forced to a *Preter-Naturall* Extent, or Dimension, delivereth and restoreth it selfe to the Naturall: As when a *Blowne Bladder* (Pressed) riseth againe; or when *Leather* or *Cloathe* tentured spring backe. These two *Motions* (of which there be infinite Instances,) we shall handle in due place.

13 This *Motion* upon *Pressure* is excellently also demonstrated in *Sounds* As when one Chimeth upon a *Bell*, it soundeth; But as soon as he layeth his hand upon it, the *Sound* ceaseth: And so, the *Sound* of a *Virginall String*, as soone as the Quill of the Iack falleth upon it, stoppeth. For these *Sounds* are produced, by the subtile Percussion of the Minute parts, of the *Bell*, or *String*, upon the Aire; All one, as the *water* is caused to leape by the subtile Percussion of the Minute parts of the *Glasse*, upon the Water, whereof we spake a little before in the 9th. *Experiment*. For you must not take it to be, the locall *Shaking* of the *Bell*, or *String*, that doth it. As well shall fully declare, when we come hereafter to handle *Sounds*.

Experiments in *Consort*, touching *Separations* of *Bodies by Weight*.

14 TAke a *Glasse* with a *Belly* and a long *Nebb*; fill the *Belly* (in part) with *water*: Take also another *Glasse*, whereinto put *Claret wine* and *water* mingled, Reverse the first *Glasse*, with the *Belly* upwards Stopping the *Nebb* with your fingar; Then dipp the Mouth of it within the Second *Glasse*, and remove your Finger: Continue it in that posture for a time; And it will unmingle the *wine* from the *Water*: The *wine* ascending and setling in the topp of the upper *Glasse*; And the *water* descending and setling in the bottome of the lower *Glasse*. The passage is apparent to the Eye; For you shall see the *wine*, as it were, in a small veine, rising through the *water*. For handsomnesse sake (because the Working requireth some small time) it were good you hang the upper *Glasse* upon a Naile. But as soone as there is gathered so much pure and unmixed *water* in the Bottome of the Lower *Glasse*, as that the Mouth of the upper *Glasse* dippeth into it, the *Motion* ceaseth.

15 Let the Vpper *Glasse* be *Wine*, and the Lower *water*; there followeth no *Motion* at all. Let the Upper *Glasse* be *Water* pure, the Lowwer *water* coloured; or contrariwise; there followeth no *Motion* at all. But it hath beene tried, that though the Mixture of *VVine* and *VVater*, in the Lower *Glasse*, be three parts *VVater*, and but one *VVine*; yet it doth not dead the *Motion*. This *Separation* of *VVater* and *VVine* appeareth to be made by *VVeight*; for it must be of *Bodies* of unequall *VVeight* or ells it worketh not; And the Heavier *Body* must ever be in the upper *Glasse* But then note withall, that the *VVater* being made pensile, and ther being a great *VVeight* of *VVater* in the *Belly* of the *Glasse*, sustained

by

by a ſmall Pillar of *Water* in the Neck of the *Glaſſe*; It is that, which ſetteth the *Motion* on worke: For *Water* and *Wine* in one *Glaſſe*, with long ſtanding, will hardly ſever.

16 This *Experiment* would be Extended from Mixtures of ſeverall *Liquors*, to *Simple Bodies*, which Conſiſt of ſeverall Similare Parts: Try it therefore with *Broyne* or *Salt water*, and *Freſh water*: Placing the *Salt water* (which is the heavier) in the upper *Glaſſe*; And ſee whether the *Freſh* will come above. Try it alſo with *Water thick Sugred*, and *Pure water*; and ſee whether the *water* which commeth above, will looſe his Sweetneſſe: For which purpoſe it were good there were a little Cock made in the Belly of the upper *Glaſſe*.

Experiments in Conſort touching *Iudicious & Accurate Infuſions*, both in *Liquors*, and *Aire*.

17 IN *Bodies* containing Fine Spirits, which doe eaſily diſſipate, when you make *Infuſions*, the Rule is; A ſhort Stay of the *Body* in the *Liquour* receyveth the Spirit; And a longer Stay confoundeth it; becauſe it draweth forth the Earthy Part withall; which embaſeth the finer. And therfore it is an Errour in *Phyſicians*, to reſt ſimply upon the Length of ſtay, for encreaſing the vertue. But if you will have the *Infuſion* ſtrong, in thoſe kind of *Bodies*, which have fine Spirits, your way is, not to give Longer time, but to repeat the *Infuſion* of the *Body* oftner. Take *Violetts*, and infuſe a good Pugill of them in a Quart of Vineger; Lett them ſtay three quarters of an houre, and take them forth; And refreſh the *Infuſion* with like quantity of new *Violets*, ſeven times; And it will make a Vineger ſo freſh of the *Flower*, as if a Twelve-moneth after, it be brought you in a Saucer, you ſhall ſmell it before it come at you. Note, that it ſmelleth more perfectly of the Flower, a good which after, then at firſt.

18 This Rule, which we have given, is of ſingular uſe, for the Preparations of *Medicines*, and other *Infuſions*. As for Example; the Leafe of *Burrage* hath an Excellent Spirit, to repreſſe the fuliginous Vapour of Dusky Melancholy, and ſo to cure Madnes: But nevertheleſſe, if the Leafe be infuſed long, it yeeldeth forth but a raw ſubſtance, of no Vertue: Therefore I ſuppoſe, that if in the Muſt of Wine, or Wort of Beere, while it worketh, before it be Tunned, the *Burrage* ſtay a ſmall time, and be often changed with freſh; It will make a Soveraigne Drink for Melancholy Paſſions. And the like I conceive of *Orenge Flowers*.

19 *Rubarb* hath manifeſtly in it Parts of contrary Operations: Parts that purge; And parts that binde the body: And the firſt lay looſer, and the latter lay deeper: So that if you infuſe *Rubarb* for an houre, and cruſh it well, it will purge better, and bind the Body leſſe after the purging, than if it ſtood twenty foure houres; This is tried: But I conceive likewiſe, that by Repeating the *Infuſion* of *Rubarb*, ſeverall times, (as was ſaid of Violetts,) letting each ſtay in but a ſmall time; you may make it as ſtrong a *Purging Medicine*, as *Scammony*. And it is not a ſmall thing wonn in *Phyſick*, if you cau make *Rubarb*, and other *Mede-*

cines that are *Benedict*, as strong Purgers, as those that are not without some Maligntty.

20 *Purging Medicines*, for the most part, have their *Purgative* Vertue, in a fine Sririt; As apreareth by that they indure not boiling, without much losse of vertue. And therefore it is of good use in *Physick*, if you can retaine the *Purging* Vertue, and take away the Unpleasant taste of the *Purger*; which it is like you may doe, by this Course of *Infusing* oft, with little stay. For it is probable, that the Horrible and Odious Taste, is in the Grosser part.

21 Generally, the working by *Infusions*, is grosse and blind, except you first try the Issuing of the severall Parts of the Body, which of them Issue more speedily, and which more slowly; And so by apportioning the time, can take and leave that Quality, which you desire. This to know, there be two waies; The one to try what long stay, & what short stay worketh, as hath been said: The other to try in Order, the succeeding *Infusions*, of one and the same Body, successively, in severall *Liquours*. As for example; Take *Orenge-Pills*, or *Rose-Mary*, or *Cinnamon*, or what you will; And let them *Infuse* halfe an houre in *water*: Then take them out; and *Infuse* them againe in other *water*; And so the third time: And then taste and consider the *first water*, the *Second*, and the *Third*: And you will find them differing, not only in Strength and Weaknes, but otherwise in Taste, or Odour; For it may bee the *First water* will have more of the Sent, as more Fragrant; And the *Second* more of the Taste, as more bitter or Biting, &c.

22 *Infusions* in *Aire*, (for so we may well call *Odours*) have the same diversities with *Infusions* in *water*; In that the severall *Odours* (which are in one Flower, or other Body) issue at severall times; Some earlier, some later: So we find that *Violets*, *Woodbines*, *Strawberries*, yeeld a pleasing Sent, that commeth forth first; But soone after an ill Sent quite differing from the Former. Which is caused, not so much by Mellowing, as by the late Issuing of the Grosser Spirit.

23 As we may desire to extract the finest Spirits in some Cases; So we may desire also to discharge them (as hurtfull) in some other. So *wine burnt*, by reason of the Evaporating of the finer Spirit, enflameth lesse, and is best in Agues: *Opium* leeseth some of his poisonous Quallity, if it be vapoured out, mingled with *Spirit* of *wine*, or the like: *Sean* leeseth somewhat of his windines by Decocting; And (generally) subtile or windy Spirits are taken off by Incension, or Evaporation. And even in *Infusions* in things that are of too high a Spirit, you were better poure off the first *Infusion*, after a small time, and use the latter.

Experiment Solitary touching the *Appetite* of *Continuation in Liquids*.

24 *Bubbles* are in the forme of an *Hemisphere*; *Aire* within, and a little Skin of *water* without: And it seemeth somewhat strange, that the *Aire* should rise so swiftly, while it is in the *water*; And when it commeth to the top, should be staid by so weake a Cover as that of the *Bubble* is. But as for the swift Ascent of the *Aire*, while it is under the

the *water*, that is a *Motion* of *Percussion* from the *water*; which it selfe descending, driveth up the Aire; and no *Motion* of *Levity* in the *Aire*. And this *Democritus* called *Motus Plagæ*. In this Common *Experiment*, the Cause of the Enclosure of the *Bubble* is, for that the Appetite to resist Separation, or Discontinuance, (which in solide *Bodies* is strong) is also in *Liquours*, though fainter and weaker; As wee see in this of the *Bubble*: we see it also in little Glasses of Spittle that children make of Rushes; And in Castles of Bubbles, which they make by blowing into *water*, having obtained a little Degree of Tenacity by Mixture of Soape: Wee see it also in the *Stillicides* of *water*, which if there be *water* enough to follow, will Draw themselves into a small thred, because they will not discontinue; But if there be no Remedy, then they cast themselves into round Drops; which is the Figure, that saveth the Body most from Discontinuance: The same Reason is of the Roundnes of the *Bubble*, as well for the Skin of *water*, as for the *Aire* within: For the *Aire* likewise avoideth *Discontinuance*; And therfore casteth it selfe into a round Figure. And for the stopp and Arrest of the *Aire* a little while, it sheweth that the *Aire* of it selfe hath little, or no Appetite, of Ascending.

Experiment Solitary touching the Making of *Artificiall Springs*. 25

THE Rejection, which I continually use, of *Eperiments*, (though it appeareth not) is infinit; But yet if an *Experiment* be probable in the Worke, and of great Use, I receive it, but deliver it as doubtfull. It was reported by a Sober Man, that an *Artificiall Spring* may be made thus: Find out a hanging Ground, where there is a good quick Fall of Raine-water. Lay a Halfe-Trough of Stone, of a good length, 3. or 4. foote deepe within the same Ground; with one end upon the high Ground, the other upon the low. Cover the Trough with Brakes a good thicknes, and cast Sand upon the Top of the Brakes: You shall see, (saith he) that after some showers are past, the lower End of the Trough will run like a *Spring* of *water*: which is no marvaile, if it hold, while the Raine-water lasteth; But he said it would continue long time after the Raine is past: As if the water did multiply it selfe upon the Aire, by the helpe of the Coldnesse & Condensation of the Earth, and the Consort of the first Water.

Experiment Solitary touching the *Venemous Quality* of *Mans Flesh*. 26

THE *French*, (which put off the Name of the *French Disease*; unto the Name of the *Disease* of *Naples*,) doe report, that at the Siege of *Naples*, there were certaine wicked Merchants that Barrelled up *Mans flesh*, (of some that had beene lately slaine in *Barbary*) and sold it for *Tunny*; And that upon that foule and high Nourishment, was the Originall of that *Disease*. Which may well be; For that it is certaine, that the *Caniballs* in the *west Indies*, eat *Mans flesh*; And the *west Indies* were full of the Pockes when they were first discovered: And at this day the *Mortalest poisons*, practised by the *west Indians*, have some Mixture of the Bloud, or Fat, or Flesh of *Man*: And divers Witches, and

Sorcereſſes, as well amongſt the *Heathen*, as amongſt the *Chriſtians*, have fed upon *Mans fleſh*, to aid (as it ſeemeth) their Imagination, with High and foule Vapours.

Experiment Solitary touching the *Verſion* and *Tranſmutation* of *Aire* into *Water*.

27

IT ſeemeth that there be theſe waies (in likelihood) of *Verſion* of *Vapours* or *Aire*, into *Water* and *Moiſture*. The firſt is *Cold*; which doth manifeſtly Condenſe; As wee ſee in the *Contracting of the Aire* in the *weather-Glaſſe*; whereby it is a Degree nearer to *Water*. Wee ſee it alſo in the *Generation of Springs*, which the *Ancients* thought (very probably) to be made by the *Verſion* of *Aire* into *Water*, holpen by the *Reſt*, which the *Aire* hath in thoſe Parts; whereby it cannot diſſipate. And by the *Coldnes* of *Rockes*; for there *Springs* are chiefly generated. Wee ſee it alſo in the Effects of the *Cold* of the *Middle Region* (as they call it) of the *Aire*; which produceth *Dews*, and *Raines*. And the Experiment of Turning *water* into *Ice*, by Snow, Nitre, and Salt, (whereof wee ſhall ſpeake hereafter,) would be transferred to the Turning of *Aire* into *water*. The Second way is by *Compreſſion*; As in *Stillatories*, wher the Vapour is turned back, upon it ſelfe, by the Encounter of the Sides of the *Stillatory*; And in the *Dew* upon the Covers of *Boyling Pots*; And in the *Dew* towards *Raine*, upon *Marble*, and *Wainſcot*. But this is like to doe no great effect; Except it be upon Vapours, and groſſe *Aire*, that are already very neere in Degree to Water. The Third is that, which may be ſearched into, but doth not yet appeare; which is, by *Mingling* of *moiſt Vapours* with *Aire*; And trying if they will not bring a Returne of more *Water*, than the *water* was at firſt: For if ſo; That Increaſe is a *verſion* of the *Aire*: Therefore put water into the Bottome of a *Stillatory*, with the Neb ſtopped; Weigh the *Water* firſt; Hang in the Middle of the *Stillatory* a large *Spunge*; And ſee what Quantitie of *water* yon can cruſh out of it; And what it is more, or leſſe, compared with the *water* ſpent; For you muſt underſtand, that if any *Verſion* can be wrought, it will be eaſilieſt done in ſmall Pores: And that is the Reaſon why wee preſcribe a *Spunge*. The Fourth way is Probable alſo, though not Appearing; Which is, by *Receiving the Aire* into the ſmall *Pores of Bodies*; For (as hath been ſaid) every thing in ſmall Quantity is more eaſie for *verſion*; And Tangible Bodies have no pleaſure in the Conſort of *Aire*, but endeavour to ſubact it into a more *Denſe Body*: But in *Entire Bodies* it is checked; becauſe if the *Aire* ſhould Condenſe, there is nothing to ſucceed: Therefore it muſt be in *looſe Bodies*, as *Sand*, and *Powder*; which wee ſee, if they lye cloſe, of themſelves gather Moiſture.

Experiment Solitary touching *Helps* towards the *Beauty* and *good Features* of *Perſons*.

28

IT is reported by ſome of the *Ancients*; That *Whelps*, or other *Creatures*, if they be put Young, into ſuch a Cage, or Box, as they cannot riſe to their Stature, but may encreaſe in Breadth, or length; will grow accordingly, as they can get Roome: which if it be true, and faiſible, and that the young *Creature* ſo preſſed, and ſtraightened,

tened, doth not therupon die; It is a Meanes to produce *Dwarfe Creatures*, and in a very Strange figure. This is certaine, and noted long since; That the Preſſure or Forming of Parts of Creatures, when they are very young, doth alter the Shape not a little; As the Stroaking of the Heads of Infants, between the Hands, was noted of Old, to make *Mocrocephali*; which ſhape of the Head, at that time, was eſteemed. And the Raiſing gently of the Bridge of the Noſe, doth prevent the Deformity of a Saddle Noſe. Which obſervation well weighed, may teach a Meanes, to make the Perſons of Men, and Women, in many kindes, more comely, and better featured, than otherwiſe they would be; By the Forming and Shaping of them in their Infancy: As by Stroaking up the Calves of the Leggs, to keepe them from falling downe too lowe; And by Stroaking up the Forehead to keepe them from being low-foreheaded. And it is a common Practice to ſwath Infants, that they may grow more ſtraight, and better ſhaped: And wee ſee Young Women, by wearing ſtraight Bodies, keepe themſelves from being Groſſe, and Corpulent.

Experiments Solitary touching the *Condenſing* of *Aire*, in ſuch ſort as it may put on *weight*, and yeeld *Nouriſhment*.

29

ONions, as they hang, will many of them ſhoot forth; And ſo will *Penniroiall*; And ſo will an Herb called *Orpin*; with which they uſe, in the Country, to trimme their Houſes, binding it to a Lath, or Stick, and ſetting it againſt a wall. Wee ſee it likewiſe, more eſpecially, in the greater *Semper-vive*, which will put out Branches, two or three yeares: But it is true, that commonly they wrapp the Root in a Cloth beſmeared with *Oyle*, and renue it once in halfe a Yeare. The like is reported by ſome of the *Ancients*, of the *Stalks of Lillies*. The Cauſe is; For that theſe *Plants* have a Strong, Denſe, and Succulent Moiſture, which is not apt to exhale; And ſo is able, from the old ſtore, without drawing helpe from the Earth, to ſuffice the ſprouting of the *Plant*: And this Sprouting is chiefly in the late Spring, or early Sommer; which are the Times of Putting forth. Wee ſee alſo, that *Stumps* of *Trees*, lying out of the ground, will put forth Sprouts for a Time. But it is a Noble Triall, and of very great Conſequence, to try whether theſe things, in the Sprouting, doe increaſe *Weight*; which muſt be tried, by weighing them before they bee hangd up; And afterwards againe, when they are ſprouted. For if they encreaſe not in *weight*; Then it is no more but this; That what they ſend forth in the Sprout, they leeſe in ſome other Part: But if they gather *weight*, then it is *Magnale Naturæ*; For it ſheweth that *Aire* may bee made ſo to bee Condenſed, as to bee converted into a *Denſe Body*; wheras the Race and Period of all things, here above the Earth, is to extenuate and turne things to bee more *Pneumaticall*, and Rare, And not to bee Retrograde, from *Pneumaticall* to that which is *Denſe*. It ſheweth alſo, that *Aire* can *Nouriſh*; which is another great Matter of Conſequence. Note, that to try this, the *Experiment* of the *Semper-vive* muſt bee made without Oiling the Cloth; For elſe, it may be, the *Plant* receiveth Nouriſhment from the Oile.

Experiment Solitary touching the *Commixture* of *Flame* and *Aire*, and the *great Force* thereof.

30

Flame and *Aire* doe not Mingle, except it be in an *Instant*; Or in the *vitall Spiritts* of *vegetables*, and *living Creatures*. In *Gunpowder*, the Force of it hath beene ascribed, to Rarefaction of the Earthy Substance into *Flame*; And thus farre it is true: And then (forsooth) it is become another Element; the Forme whereof occupieth more place; And so, of Necessity, followeth a Dilatation: And therefore, lest two Bodies should be in one place, there must needes also follow an Expulsion of the pellet; Or Blowing up of the Mine. But these are Crude and Ignorant Speculations. For *Flame*, if there were nothing els, except it were in very great quantity, will bee suffocate with any hard Body, such as a Pellet is, Or the Barrell of a Gunn; So as the *Flame* would not expell the hard Body; But the hard Body would kill the *Flame*, and not suffer it to kindle, or spread. But the Cause of this so potent a Motion, is the *Nitre*, (which wee call otherwise *Salt-Petre*;) which having in it a notable Crude and windy *Spirit*, first by the *Heate* of the *Fire* suddainly dilateth it self; (And wee know that simple *Aire*, being preternaturally attenuated by *Heate*, will make it selfe Roome, and breake and blow vp that which resisteth it;) And Secondly, when the *Nitre* hath dilated it self, it bloweth abroad the *Flame*, as an inward Bellowes. And therefore we see that *Brimstone*, *Pitch*, *Camphire*, *Wilde-Fire*, and divers other Inflammable Matters, though they burne cruelly, and are hard to quench; Yet they make no such fiery winde, as *Gunpowder* doth: And on the other side, wee see that *Quick-Silver*, (which is a most Crude and Watry *Body*) heated, and pent in, hath the like force with *Gunpowder*. As for *living Creatures*, it is certaine, their *Vitall Spiritts* are a Substance Compounded of an *Airy* and *Flamy* Matter; And though *Aire* and *Flame* being free, will not well mingle; yet bound in by a *Body* that hath some fixing, they will. For that you may best see in those two Bodies, (which are their *Aliments*,) *water*, and *Oyle*? For they likewise will not well mingle of themselves, but in the Bodies of *Plants*, and *Living Creatures*, they will. It is no marvaile therfore, that a small *Quantity* of *Spiritts*, in the Cells of the Braine, and Cannales of the Sinewes, are able to moue the whole Body, (which is of so great Masse,) both with so great Force, as in Wrestling, Leaping; And with so great Swiftnes, As in playing Division upon the *Lute*. Such is the force of these two Natures, *Aire* and *Flame*, when they incorporate.

Experiment Solitary touching the *Secret Nature* of *Flame*.

31

TAke a small *wax Candle*, and put it in a Socket, of Brasse, or Iron; Then sett it upright in a Porringer full of *Spiritt of Wine*, heated: Then sett both the *Candle*, and *Spiritt of wine*, on fire, and you shall see the *Flame* of the *Candle*, open it self, and become 4. or 5. times bigger than otherwise it would have been; and appeare in Figure *Globular*, and not in *Piramis*. You shall see also, that the Inward *Flame* of the *Candle* keepeth Colour, and doth not waxe any whitt blewe towards the Colour of the Outward *flame* of the *Spiritt of wine*. This is a Noble

Instance;

Instance; wherein two things are most remarkable; The one; that one *Flame* within another quencheth not; but is a fixed Body, and continueth as *Aire*, or *Water* doe. And therefore *Flame* would still ascend upwards in one greatnesse, if it were not quenched on the *Sides*: And the greater the *Flame* is at the Bottome, the higher is the Rise. The other, that *Flame* doth not mingle with *Flame*, as *Aire* doth with *Aire*, or *water* with *Water*, but only remaineth contiguous, As it commeth to passe betwixt Consisting Bodies. It appeareth also, that the forme of a Piramis in *Flame*, which we vsually see, is meerely by Accident, and that the *Aire* about, by quenching the Sides of the *Flame*, crusheth it, and extenuateth it into that Forme; For of it selfe it would bee Round: And therefore *Smoake* is in the Figure of a Piramis Reversed; For the *Aire* quencheth the *Flame*, and receiveth the *Smoake*. Note also, that the *Flame* of the *Candle*, within the *Flame* of the *Spirit of Wine*, is troubled; And doth not onely open and move upwards, but moveth waving, and to and fro: As if *Flame* of his owne Nature (if it were not quenched,) would rowle and turne, as well as move upwards. By all which it, it should seeme, that the Cælestiall Bodies, (most of them,) are true *Fires* or *Flames*, as the *Stoicks* held; More fine (perhaps) and Rarified, than our *Flame* is. For they are all Globular, and Determinate; They have Rotation; And they have the Colour and Splendour of *Flame*: So that *Flame* above is Durable, and Consistent, and in his Naturall place; But with us, it is a Stranger, and Momentany, and Impure; Like *Vulcan* that halted with his Fall.

Experiment Solitary touching the *Different force* of *Flame* in the *Middest* and on the *Sides*.

32

TAke an *Arrow*, and hold it in *Flame*, for the space of ten pulses; And when it commeth forth, you shall finde those Parts of the *Arrow*, which were on the Outsides of the *Flame*, more burned, blacked, & turned almost in to a Coale; whereas that in the Middest of the *Flame*, will be, as if the Fire had scarce touched it. This is an *Instance* of great consequence for the discovery of the Nature of *Flame*; And sheweth manifestly, that *Flame* burneth more violently towards the Sides, than in the Middest: And, which is more, that *Heat* or *Fire* not violent or furious, but where it is checked and pent. And therfore the *Peripatetickes* (howsoever their opinion of an *Element* of *Fire* above the *Aire* is justly exploded;) in that Point they acquit themselves well: For being opposed, that if there were a *Spheare* of *Fire*, that incompassed the Earth so neare hand, it were impossible but all things should be burnt up; They answer, that the pure *Elementall Fire*, in his owne place, and not irritate, is but of a Moderate *Heat*.

Experiment Solitary touching the *Decrease* of the *Naturall motion* of *Gravity* in *great distance from the Earth*; or *within some depth of the Earth*.

33

IT is affirmed constantly by mãy, as an usuall Experiment; That a *Lumpe* of *Vre*, in the *Bottome* of a Mine, will bee tumbled, and stirred, by two Mens strength; which if you bring it to the *Topp* of the *Earth*, will aske Six Mens strength at the least to stirre it. It is a Noble *Instance*, and is fit to be tried to the full: For it is very probable, that the *Motion* of

of *Gravitie* worketh weakly, both farre from the Earth, and also within the Earth: The former, because the Appetite of Union of Dense Bodies with the Earth, in respect of the distance, is more dull; The latter, because the Body hath in part attained his Nature, when it is some Depth in the Earth. For as for the Moving to a *Point* or Place (which was the Opinion of the *Ancient*) it is a meere Vanity.

Experiment Solitary touching the *Contraction* of *Bodies* in *Bulke*, by the *Mixture* of the more *Liquid Body* with the more *Solid*.

34

IT is strange, how the *Ancients* tooke up *Experiments* upon credit, and yet did build great Matters upon them. The Observation of some of the best of them, delivered confidently is, That a *Vessell* filled with *Ashes*, will receive the like quantity of *water*, that it would have done, if it had been empty. But this is utterly untrue; for the *water* will not goe in by a Fifth part. And I suppose, that that Fifth part is the difference of the lying close, or open, of the *Ashes*; As wee see that *Ashes* alone, if they be hard pressed, will lye in lesse roome: And so the *Ashes* with Aire betweene, lye looser; and with *water*, closer. For I have not yet found certainly, that the *water*, it selfe, by mixture of *Ashes*, or *Dust*, will shrinke or draw into lesse Roome.

Experiment Solitary touching the *Making Vines* more *fruitfull*.

35

IT is reported of credit, that if you lay good store of *Kernells* of *Grapes*, about the *Root* of a *Vine*; it will make the *Vine* come earlier and prosper better. It may bee tried with other *Kernells*, laid about the *Root* of a *Plant* of the same kinde; As *Figgs*, *Kernells* of *Apples*, &c. The Cause may bee, for that the *Kernells* draw out of the Earth Juice fit to nourish the *Tree*, as those that would be *Trees* of themselves, though there were no *Root*; But the *Root* being of greater strength, robbeth and devoureth the Nourishment, when they have drawne it: As great *Fishes* devoure little.

Experiments in Consort touching *Purging Medicines*.

36

THe *Operation* of *Purging Medicines*, and the *Causes* thereof, have been thought to be a great Secret; And so according to the slothfull manner of Men, it is referred to a *Hidden Propriety*, a *Specificall vertue*, and a *Fourth Qualitie*, and the like Shifts of Ignorance. The *Causes* of *Purging* are diuers; All plaine and perspicuous; And throughly maintained by Experience. The first is, That whatsoever cannot bee overcome and digested by the *Stomacke*, is by the *Stomacke*, either put up by *Vomit*, or put downe to the *Guts*; And by that *Motion* of *Expulsion* in the *Stomacke*, and *Guts*, other *Parts of the Body*, (as the *Orifices* of the *Vines*, and the like) are moved to expell by *Consent*. For nothing is more frequent than *Motion of Consent* in the Body of Man. This Surcharge of the *Stomacke*, is caused either by the *Qualitie* of the *Medicine*, or by the *Quantitie*. The *Qualities* are three: *Extreme Bitter*, as in *Aloës*, *Coloquintida*, &c. *Loathsome* and of horrible taste; As in *Agarick*, *Black Hellebore*, &c. And of *secret Malignity*, and disagreement towards *Mans Bodie*, many times not appearing much in the Taste; As in *Scammony*, *Mechoacham*, *Antimony*, &c. And note well, that if there be any *Medicine*

that

that *Purgeth*, and hath neither of the first two *Manifest Qualities*; it is to bee held suspected, as a kinde of *Poyson*; For that it worketh either by *Corrosion*; or by a *secret Malignitie* and Enmitie to *Nature*: And therefore such *Medicines* are warily to bee prepared, and used. The *Quantitie* of that which is taken, doth also cause *Purging*; As wee see in a great *Quantitie* of *New Milke* from the Cow; yea and a great *Quantitie of Meat*; For *Surfets* many times turne to *Purges*, both upwards, and downwards. Therfore we see generally, that the working of *Purging Medicines*, commeth two or three houres after the *Medicines* taken; For that the *Stomacke* first maketh a proofe, whether it can concoct them. And the like happeneth after *Surfets*; Or *Milke* in too great *Quantitie*.

A second *Cause* is *Mordication* of the *Orifices* of the *Parts*; Especially of the *Mesentery veines*; As it is seene, that *Salt*, or any such thing that is sharpe and biting, put into the Fundament, doth provoke the Part to expell; And *Mustard* provoketh Sneezing: And any Sharpe Thing to the Eyes, provoketh Teares. And therefore we see that almost all *Purgers* have a kinde of *Twiching* and *vellication*, besides the *Griping* which commeth of wind. And if this *mordication* bee in an ouer-high Degree, it is little better than the *Corrosion* of *Poyson*; And it commeth to passe sometimes in *Antimony*; Especially if it be given, to Bodies not repleat with Humors; For where Humors abound, the Humors save the Parts. 37

The third *Cause* is *Attraction*: For I doe not deny, but that *Purging Medicines* have in them a direct Force of *Attraction*; As *Drawing Plasters* have in *Surgery*: And wee see *Sage*, or *Bettony bruised*, *Sneezing-powder*, and other *Powders* or *Liquors* (which the *Physitians* call *Errhines*,) put into the Nose, draw Flegme, and water from the Head; And so it is in *Apophlegmatismes*, and *Gargarismes*, that draw the Rheume downe by the Pallate. And by this Vertue, no doubt, some *Purgers* draw more one Humour, and some another, according to the Opinion received: As *Rubarb* draweth Choller; *Sean* Melancholy; *Agarick* Flegme; &c. But yet, (more or lesse) they draw promiscuously. And note also, that besides Sympathy, between the *Purger* and the *Humour*, there is also another Cause, why some *Medicines* draw some Humour more than another. And it is, for that some *Medicines* work quicker than others: And they that draw quick, draw only the Lighter, and more fluide Humours; they that draw slow, worke upon the more Tough, and Viscous Humours. And therfore Men must beware, how they take *Rubarb*, and the like, alone, familiarly, For it taketh onely the Lightest part of the Humour away, and leaveth the Masse of Humours more obstinate. And the like may be said of *Worme-wood*, which is so much magnified. 38

The fourth *Cause* is *Flatuosity*; For *wine* stirred moveth to expell: And wee finde that (in effect) all *Purgers* have in them a raw *Spirit*, or *wind*; which is the Principall *Cause* of *Tortion* in the *Stomach*, and *Belly*. And therefore *Purgers* leese (most of them) the vertue, by Decoction upon the Fire; And for that Cause are given chiefly in Infusion, Juyce, or Powder. 39

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40 The fifth *Cauſe* is *Compreſſion*, or *Cruſhing*: As when *Water* is Cruſhed out of a *Spunge*: So we ſee that *Taking Cold* moveth Looſeneſſe by Contraction of the skinn, and outward Parts; And ſo doth *Cold* likewiſe cauſe Rheumes, and Defluxions from the Head; And ſome *Aſtringent Plaſters* cruſh out purulent Matter. This kind of Operation is not found in many *Medicines*: *Mirabolanes* have it; And it may bee the *Barkes of Peaches*; For this Vertue requireth an *Aſtriction*; but ſuch an *Aſtriction*, as is not gratefull to the Body; (For a pleaſing *Aſtriction* doth rather Binde in the Humours, than Expell them:) And therefore ſuch *Aſtriction* is found in Things of an Harriſh Taſte.

41 The Sixth *Cauſe* is *Lubrefaction*, and *Relaxation*. As wee ſee in *Medicines Emollient*; Such as are *Milke*, *Honey*, *Mallowes*, *Lettuce*, *Mercuriall*, *Pelletory of the Wall*, and others. There is alſo a ſecret Vertue of *Relaxation* in *Cold*: For the *Heat* of the Body bindeth the Parts and Humours together, which *Cold*, relaxeth: As it is ſeene in *Vrine*, *Bloud*, *Pottage*, or the like; which, if they be *Cold*, Breake, and diſſolve. And by this kinde of *Relaxation*, *Feare* looſeneth the Belly; becauſe the Heat retiring inwards towards the Heart, the Gutts and other Parts are relaxed; In the ſame manner as *Feare* alſo cauſeth Trembling in the Sinewes. And of this Kinde of *Purgers* are ſome *Medicines* made of *Mercury*.

42 The Seventh *Cauſe* is *Abſterſion*; which is plainly a *Scouring off*, or *Inciſion* of the *more viſcous Humors*, and making the *Humors* more fluide; And Cutting betweene them, and the Part. As is found in *Nitrous Water*, which ſcoureth Linnen Cloth (ſpeedily) from the Foulneſſe. But this *Inciſion* muſt bee by a *Sharpneſſe*, without *Aſtriction*: Which wee finde in *Salt*, *Worm-wood*, *Oxymel*, and the like.

43 There bee *Medicines*, that move *Stooles*, and not *Vrine*; Some other, *Vrine*, and not *Stooles*. Thoſe that *Purge by Stoole*, are ſuch as enter not at all, or little into the *Meſentery Veines*; But either at the firſt are not digeſtible by the *Stomach*, and therefore move immediatly downwards to the *Gutts*, Or elſe are afterwards rejected by the *Meſentery Veines*, and ſo turne likewiſe downwards to the *Gutts*; and of theſe two kindes are moſt *Purgers*. But thoſe that move *Vrine*, are ſuch, as are well digeſted of the *Stomach*, and well received alſo of the *Meſentery Veines*; So they come as farre as the *Liver*, which ſendeth *Vrine* to the *Bladder*, as the *Whey of Bloud*: And thoſe *Medicines* being Opening and Piercing, doe fortifie the Operation of the *Liver*, in ſending downe the wheyey Part of the Bloud to the *Reines*. For *Medicines Vrinative* doe not worke by Rejection, and Indigeſtion, as *Solutive* doe.

44 There bee divers *Medicines*, which in greater *Quantity*, move *Stoole*, and in ſmaller, *Vrine*: And ſo contrariwiſe, ſome that in greater *Quantity*, move *Vrine*, and in Smaller, *Stoole*. Of the former ſort is *Rubarb*, and ſome others. The *Cauſe* is, for that *Rubarb* is a *Medicine*, which the Stomach in a ſmall Quantity doth digeſt, and overcome, (being not Flatuous, nor Loathſome;) and ſo ſendeth it to the *Meſentery Veines*; And ſo being opening, it helpeth downe *Vrine*: But in a greater Quantitie, the

the *Stomach* cannot overcome it, and so it goeth to the *Gutts*. *Pepper* by some of the *Ancients* is noted to bee of the second sort; which being in small *Quantity*, moveth wind in the Stomach and Gutts, and so expelleth by *Stoole*; But being in greater *Quantity*, dissipateth the *wind*; And it selfe getteth to the *Mesentery veines*; And so to the *Liver*, and *Reines*; where, by Heating and Opening, it sendeth downe *Vrine* more plentifully.

Experiments in Consort touching *Meats* and *Drinks* that are most *Nourishing*.

WE have spoken of *Evacuating* of the *Body*; we wil now speak something of the *Filling* of it by *Restoratives* in *Consumptions*, and *Emaciating Diseases*. In *Vegetables*, there is one Part that is more Nourishing than an other, As *Graines*, and *Roots* nourish more, than the *Leaves*; In so much as the *Order* of the *Foliatanes* was put downe by the *Pope*, as finding Leaves unable to Nourish Mans Body. Whether there be that difference in the Flesh of *Living Creatures*, is not well inquired: As whether *Livers*, and other *Entrails*, be not more Nourishing, than the *Outward Flesh*. We find that amongst the *Romans*, a *Gooses Liver* was a great Delicacy; In so much as they had Artificiall Meanes to make it faire, and great; But whether it were more Nourishing, appeareth not. It is certaine, that *Marrow* is more Nourishing than *Fat*. And I conceive that some Decoction of *Bones*, and *Sinewes*, stamped, and well strained, would bee a very *Nourishing Broth*: Wee finde also that *Scotch Skinck*, (which is a Pottage of strong Nourishment,) is made with the *Knees*, and *Sinewes* of *Beefe*, but long boiled: *Ielly* also, which they vse for a Restorative, is chiefly made of *Knuckles* of *Veale*. The *Pulp* that is within the *Crafish* or *Crab*, which they spice and butter, is more Nourishing than the *Flesh* of the *Crab*, or *Crafish*. The *Yolkes* of *Egges* are clearely more Nourishing than the *whites*. So that it should seeme, that the Parts of *Living Creatures*, that lye more Inwards, nourish more than the Outward Flesh: Except it bee the *Braine*; which the Spirits prey too much upon, to leave it any great Vertue of Nourishing. It seemeth for the Nourishing of Aged Men, or Men in Consumptions, some such thing should be Devised, as should be halfe *Chylus*, before it be put into the Stomach.

45

Take two large *Capons*; perboile them upon a soft fire, by the space of an houre, or more, till in effecte all the Bloud be gone. Adde in the Decoction the *Pill* of a *Sweet Limon*, or a good part of the *Pill* of a *Citron*, and a little *Mace*. Cut off the *Shankes*, and throw them away. Then with a good strong Chopping-knife, mince the two *Capons*, bones and all, as small as ordinary Minced Meat; Put them into a large neat Boulter; Then take a Kilderkin, sweet, and well seasoned, of foure gallons of Beere. of 8.s. strength, new as it commeth from the Tunning; Make in the Kilderkin a great Bung-hole of purpose: Then thrust into it, the Boulter (in which the *Capons* are) drawne out in length; Let it steepe in it three Dayes, and three Nights, the Bung-hole open, to worke; Then close the Bung-hole, and so let it continue, a Day and an halfe; Then draw

46

draw it into bottles, and you may drinke it well after three dayes Botteling; And it will last six weeks (approved.) It drinketh fresh, flowreth and mantleth exceedingly; It drinketh not newesh at all; It is an excellent Drinke for a Consumption, to be drunke either alone, or Carded with some other Beere. It quencheth Thirst, and hath no whit of windinesse. Note, that it is not possible, that Meat and Bread, either in Broths, or taken with Drink, as is used, should get forth into the veines, and outward Parts, so finely, and easily, as when it is thus Incorporate, and made almost a *Chylus* aforehand.

47 Triall would bee made of the like Brew with *Potado Roots*, or *Burr Rootes*, or the *Pith* of *Artichoakes*, which are nourishing Meats: It may be tried also, with other flesh; As *Pheasant*, *Partridge*, *Young Porke*, *Pigge*, *Venison*, especially of *young Deere*, &c.

48 A *Mortresse* made with the *Brawne* of *Capons*, stamped, and strained, and mingled (after it is made) with like quantitie, (at the least,) of *Almond Butter*; is an excellent Meat to Nourish those that are weake, Better than *Blanck-Manger*, or *Ielly*: And so is the *Cullice* of *Cockes*, boyled thick with the like Mixture of *Almond Butter*: For the *Mortresse*, or *Cullice*, of it selfe, is more Savoury and strong; And not so fit for Nourishing of weake Bodies; But the *Almonds* that are not of so high a taste as *Flesh*, doe excellently qualifie it.

49 *Indian Maiz* hath (of certaine) an excellent Spirit of Nourishment; But it must bee throughly boyled, and made into a *Maiz-Creame* like a *Barley Creame*. I judge the same of *Rize*, made into a Creame; For *Rize* is in *Turky*, and other Countries of the East, most fed upon; But it must be throughly boyled in respect of the Hardnesse of it: And also because otherwise it bindeth the Body too much.

50 *Pistachoes*, so they be good, and not musty, joyned with *Almonds* in *Almond Milke*; Or made into a *Milke* of themselves, like unto *Almond Milke*, but more greene, are an excellent Nourisher. But you shall doe well, to adde a little *Ginger*, scraped, because they are not without some subtill windinesse.

51 *Milke* warme from the Cow, is found to be a great Nourisher, and a good Remedy in *Consumptions*: But then you must put into it, when you milke the Cowe, two little bagges; the one of *Powder* of *Mint*, the other of *Powder* of *Red Roses*; For they keepe the *Milke* somewhat from Turning, or Crudling in the stomach; And put in Suggar also, for the same cause, and partly for the Tasts sake; But you must drinke a good draught that it may stay lesse time in the stomach, lest it Cruddle: And let the Cup into which you milke the Cow, bee set in a greater Cup of hot water, that you take it warme. And *Cow-milke* thus prepared, I judge to be better for a *Consumption*, than *Asse-milke*, which (it is true) turneth not so easily, but it is a little harrish; Marry it is more proper for Sharpnesse of Vrine, and Exulceration of the Bladder, and all manner of Lenifyings. *Womans milke* likewise is prescribed, when all faile; but I commend it not; as being a little too neere the Juyce of Mans Bo-

dy;

dy, to bee a good Nouriſher; Except it be in *Infants*, to whom it is Naturall.

Oyle of *Sweet Almonds*, newly drawne, with *Sugar*, and a little *Spice*, ſpread upon Bread toſted, is an Excellent Nouriſher; But then to keepe the *Oyle* from frying in the Stomach, you muſt drinke a good draught of Milde Beere after it; And to keepe it from relaxing the Stomach too much; you muſt put in a little Powder of Cinnamon. 52

The *Yolkes* of *Egges* are of themſelves ſo well prepared by Nature for Nouriſhment; As (ſo they be Potched, or Reare boiled) they need no other Preparation, or Mixture; yet they may be taken alſo rawe, when they are new laid, with *Malmeſey*, or *Sweet wine*; You ſhall doe well to put in ſome few Slices of *Eryngium Roots*, and a little *Amber-grice*; For by this meanes, beſides the immediate Facultie of Nouriſhment, ſuch Drinke will ſtrengthen the Backe; So that it will not draw downe the *Vrine* too faſt; For too much *Vrine* doth alwaies hinder Nouriſhment. 53

Mincing of meat, as in *Pies*, and *buttered Minced Meat*, ſaveth the Grinding of the Teeth; And therefore, (no doubt) it is more Nouriſhing; Eſpecially in Age; Or to them that have weake Teeth; But the Butter is not ſo proper for weake Bodies; And therefore it were good to moiſten it with a little *Claret wine*, Pill of *Limon*, or *Orenge*, cut ſmall, *Sugar*, and a very little *Cinnamon*, or *Nutmegg*. As for *Chuetts*, which are likewiſe minced Meat, in ſtead of Butter, and Fat, it were good to moiſten them, partly with *Creame*, or *Almond*, or *Piſtachomilke*; or *Barley*, or *Maiz Creame*; Adding a little *Coriander Seed*, and *Carraway Seed*, and a very little *Saffron*. The more full Handling of *Alimentation* we reſerve to the due place. 54

Wee have hitherto handled the Particulars *which yeeld beſt, and eaſieſt, and plentifulleſt Nouriſhment; And now wee will ſpeake of the beſt* Meanes *of Conveying, and Converting the Nouriſhment.*

The Firſt *Meanes* is, to procure that the *Nouriſhment* may not be robbed, and drawen away; wherein that, which we have already ſaid, is very Materiall; To provide, that the *Reines* draw not too ſtrongly an over-great Part of the *Bloud* into *Vrine*. To this adde that Precept of *Ariſtotle*, that *Wine* be forborne in all *Conſumptions*; For that the *Spirits* of the *wine*, doe prey upon the Roſcide Juyce of the Body, and inter-common with the Spirits of the Body, and ſo deceive and robbe them of their Nouriſhment. And therefore if the *Conſumption* growing from the weakneſſe of the Stomach, doe force you to uſe *Wine*; let it alwaies be burnt, that the Quicker Spirits may evaporate; or at the leaſt quenched with two little wedges of Gold, ſix or ſeven times repeated. Adde alſo this Proviſion, That there be not too much *Expence* of the *Nouriſhment*, by *Exhaling*, and *Sweating*: And therefore if the Patient be apt to ſweat, it muſt be gently reſtrained. But chiefly *Hippocrates* Rule is to bee followed; who adviſeth quite contrary to that which is in uſe: Namely, that the *Linnen*, or *Garment* next the Fleſh, be in Winter drie, and oft 55

changed; And in Summer seldome changed, and smeared over with Oyle; For certaine it is, that any Substance that is fat, doth a little fill the Pores of the Body, and stay Sweat, in some Degree. But the more cleanly way is, to have the *Linnen* smeared lightly over, with *Oyle* of *Sweet Almonds*; And not to forbeare shifting as oft as is fit.

56 The Second *Meanes* is, to send forth the *Nourishment* into the *Parts*, more strongly; For which, the working must be by *Strengthening* of the *Stomach*; And in this, becaus the *Stomach* is chiefly comforted by *Wine*, and *Hot things*, which otherwise hurt; it is good to resort to *Outward Applications* to the *Stomach*: Wherein it hath beene tried, that the *Quilts* of *Roses*, *Spices*, *Mastick*, *Wormewood*, *Mint*, &c. are nothing so helpfull, as to take a *Cake* of *New bread*, and to bedew it with a little *Sack*, or *Alegant*; And to drie it; And after it bee dried a little before the Fire, to put it within a cleane Napkin, and to lay it to the Stomach: For it is certaine, that all Flower hath a potent Vertue of *Astriction*; In so much as it hardeneth a peece of flesh, or a Flower that is laid in it: And therefore a *Bagge* quilted with *Bran*, is likewise very good; but it drieth somewhat too much; and therefore it must not lye long.

57 The Third *Meanes* (which may be a Branch of the former) is to send forth the *Nourishment* the better by *Sleepe*. For we see, that Beares, and other *Creatures* that *sleepe* in the Winter, wax exceeding fat: And certaine it is, (as it is commonly beleeved) that *Sleepe* doth Nourish much; Both for that the Spirits doe lesse spend the Nourishment in *Sleepe*, than when living *Creatures* are awake: And becaus (that which is to the present purpose) it helpeth to thrust out the Nourishment into the Parts. Therefore in Aged men, and weake Bodies, and such as abound not with Choller, a short *Sleepe* after dinner doth helpe to Nourish; For in such Bodies there is no feare of an over-hastie Digestion, which is the Inconvenience of Postmeridian *Sleepes*, *Sleepe* also in the Morning after the taking of somewhat of easie Digestion; As *Milke* from the Cow, *Nourishing Broth*, or the like; doth further Nourishment: But this would bee done, sitting upright, that the *Milke* or *Broth* may passe the more speedily to the bottome of the Stomach.

58 The Fourth *Meanes* is to provide that the Parts themselves may draw to them the Nourishment strongly. There is an Excellent Observation of *Aristotle*; That a great reason, why plants (some of them) are of greater Age, than *Living Creatures*, is, for that they yearely put forth new Leaves, and Boughes; whereas *Living Creatures* put forth (after their Period of Growth,) nothing that is young, but Haire and Nailes; which are Excrements, and no Parts. And it is most certaine, that whatsoever is young, doth draw Nourishment better, than that which is Old; And then (that which is the Mystery of that Observation) young *Boughes*, and *Leaves*, calling the Sap up to them; the same Nourisheth the *Body*, in the Passage. And this wee see notably proved also, in that the oft cutting, or Polling of *Hedges*, *Trees*, and *Herbs*, doth conduce much to their Lasting. Transferre therefore this Observatiou to the

Helping

Helping of Nouriſhment in *Living Creatures:* The Nobleſt and Principall Uſe whereof is, for the *Prolongation* of *Life*; *Reſtauration* of ſome Degree of *Youth*; and *Inteneration* of the *Parts*: For certaine it is, that there are in *Living Creatures* Parts that Nouriſh, and Repaire eaſily; And Parts that Nouriſh and repaire hardly, And you muſt refreſh, and renew thoſe that are eaſie to Nouriſh, that the other may bee refreſhed, and (as it were) Drinke in Nouriſhment, in the Paſſage. Now wee ſee that *Draught Oxen*, put into good Paſture, recover the Fleſh of young Beefe; And Men after long Emaciating Diets, wax plumpe, and fat, and almoſt New: So that you may ſurely conclude, that the frequent and wiſe Uſe of thoſe *Emaciating Diets*, and of *Purgings*; And perhaps of ſome kinde of *Bleeding*; is a principall Meanes of *Prolongation* of *Life*; and *Reſtoring* ſome Degree of *Youth*: For as wee have often ſaid, *Death* commeth upon *Living Creatures* like the Torment of *Mezentius*.

Mortua quinetiam jungebat Corpora vivis,
Componens Manibuſq; Manus, atq; Oribus Ora.

For the Parts in Mans Body eaſily reparable, (as *Spirits*, *Bloud*, and *Fleſh*) die in the Embracement of the Parts hardly reparable, (as *Bones*, *Nerves*, and *Membranes*;) And likewiſe ſome *Entrails* (which they reckon amongſt the *Spermaticall Parts*) are hard to repaire: Though that Diviſion of *Spermaticall*, and *Menſtruall Parts*, be but a Conceit. And this ſame *Obſervation* alſo may bee drawne to the preſent purpoſe of Nouriſhing Emaciated Bodies: And therefore *Gentle Frication* draweth forth the Nouriſhment, by making the Parts a little hungry, and heating them; whereby they call forth Nouriſhment the better. This *Frication* I wiſh to be done in the Morning. It is alſo beſt done by the *Hand* or apeece of *Scarlet wooll*, wet a little with *Oile* of *Almonds*, mingled with a ſmall Quantity of *Bay-Salt*, or *Saffron*; We ſee that the very Currying of Horſes doth make them fat, and in good liking.

The fifth *Meanes* is, to further the very *Act*, of *Aſſimilation* of *Nouriſhment*; which is done by ſome outward *Emollients*, that make the Parts more apt to *Aſſimilate*. For which I have compounded an *Ointment* of Excellent Odour, which I call *Roman Ointment*, *vide* the *Receit*. The uſe of it would bee betweene Sleepes; For in the latter Sleepe the Parts Aſſimilate chiefly. 59

THere be many *Medicines*, which by themſelves would doe no Cure, but perhaps Hurt; but being applyed in a certaine Order, one after another, doe great Cures. I have tried (my ſelfe) a *Remedy* for the *Gout*, which hath ſeldome failed, but driven it away in 24. Houres ſpace: It is firſt to apply a *Pultaſſe*; Of which *vide* the *Receit*; And then a *Bath* or *Fomentation* of which *vide* the *Receit*; And then a *Plaiſter*, *vide* the *Receit*. The *Pultaſſe* relaxeth the Pores, and maketh the Humour apt to Exhale. The *Fomentation* calleth forth the Humour by Vapours; But yet in regard of the way made by the *Pultaſſe*, Draweth gently; And therfore draweth the Humours out; and doth not draw more to it; For it

Experiment Solitary touching *Filum Medicinale*. 60

is a *Gentile Fomentation*, and hath withall a Mixture, (though very little) of some. *Stupefactive*. The *Plaister* is a Moderate *Astringent Plaister*, which repelleth New Humour from falling. The *Pultasse* alone would make the Part more soft, and weake; And apter to take the Defluxion and Impression of the Humour. The *Fomentation* alone, if it were too weake, without way made by the *Pultasse*, would draw forth little; If too strong, it would draw to the Part, as well as draw from it. The *Plaister* alone, would pen the Humour already contained in the Part, and so exasperate it, as well as forbid new Humour. Therefore they must be all taken in Order, as is said. The *Pultasse* is to bee laid to, for two or three Houres: The *Fomentation* for a Quarter of an Houre, or somewhat better, being used hot, and seven or eight times repeated: The *Plaister* to continue on still, till the Part be well confirmed.

Experiment Solitary touching *Cure by Custome*. 61

THere is a secret Way of *Cure*, (unpractized;) By *Assuetude* of that which in it selfe hurteth. *Poysons* have been made, by some, Familiar, as hath beene said. *Ordinary keepers* of the *Sicke* of the *Plague*, are seldome infected. *Enduring* of *Torturs*, by *Custome*, hath beene made more easie: The *Brooking* of Enormous *Quantity* of *Meats*, and so of *wine* or *Strong Drinke*, hath beene, by *Custome*, made to bee without *Surfet*, or *Drunkennesse*. And generally *Diseases* that are *Chronicall*, as *Coughes*, *Phthisicks*, some kindes of *Palseyes*, *Lunacies*, &c. are most dangerous at the first: Therefore a wise *Physitian* will consider whether a *Desease* be Incurable; Or whether the Just Cure of it bee not full of perill; And if hee finde it to bee such, let him resort to *Palliation*; And alleviate the *Symptome*, without busying himselfe to much with the perfect *Cure*: And many times, (if the *Patient* bee indeed patient,) that Course will exceed all Expectation. Likewise the *Patient* himselfe may strive, by little and little, to Overcome the *Symptome*, in the Exacerbation, and so, by time, turne Suffering into Nature.

Experiment Solitary touching *Cure by Excesse*. 62

DIvers *Diseases*, especially *Chronicall*, (such as *Quartian Agues*;) are sometimes cured by *Surfet*, and *Excesses*: As *Excesse of Meat*, *Excesse of Drinke*, *Extraordinary Fasting*, *Extraordinary Stirring*, or *Lassitude*, and the like. The Cause is, for that *Diseases* of *Continuance* get an Adventitious Strength from Custome, besides their *Materiall Cause* from the *Humours*: So that the *Breaking* of the *Custome* doth leaue them only to their first *Cause*; which if it be any thing weake will fall off. Besides, such *Excesses* doe Excite and Spur *Nature*, which thereupon riseth more forcibly against the *Disease*.

Experiment Solitary touching *Cure* by *Motion* of *Consent*. 63

THere is in the Body of Man a great *Consent* in the *Motion* of the severall Parts. We see, it is Childrens sport, to prove whether they can rub upon their Brieft with one hand, and pat upon their Fore-head with another; And straight waies, they shall sometimes rubbe with both Hands, or pat with both hands. Wee see, that when the Spirits, that come to the Nosthrills, expell a bad Sent, the Stomach is ready to Expell

pell by Vomit. We finde that in *Consumptions* of the *Lungs*, when Nature cannot expell by *Cough*, Men fall into *Fluxes* of the *Belly*, and then they dye. So in *Pestilent Diseases*, if they cannot bee expelled by *Sweat* they fall likewise into *Loosnesse*, and that is commonly Mortall. Therfore *Physitians* should ingeniously contrive, how by *Motions* that are in their *Power*, they may excite *Inward Motions* that are not in their *Power*, by *Consent*: As by the *Stench* of *Feathers*, or the like, they cure the *Rising* of the *Mother*.

Experiment Solitary touching *Cure* of *Diseases which are contrary to Predisposition.*

64

Hippocrates Aphorisme, In *Morbis minus*, is a good profound *Aphorisme*. It importeth, that *Diseases*, contrary to the *Complexion*, *Age*, *Sexe*, *Season of the yeare*, *Diet*, &c. are more dangerous, than those that are Concurrent. A Man would thinke it should be otherwise; For that, when the *Accident of Sickenesse*, and the *Naturall Disposition*, doe second the one the other, the *Disease* should bee more forcible: And so (no doubt) it is; if you suppose like *Quantitie* of *Matter*. But that, which maketh good the *Aphorisme*, is, Because such *Diseases* doe shew a greater *Collection of Matter*, by that they are able to overcome those *Naturall Inclinations* to the Contrary. And therefore in *Diseases* of that kinde, let the *Physition* apply himselfe more to *Purgation*, than to *Alteration*; Because the Offence is in the *Quantity*; and the *Qualities* are rectified of themselves.

Experiment Solitary touching *Preparations* before *Purging*, and *setling* of the *Body* afterward.

65

Physitians do wisely prescribe, that there be *Preparatives* used before *Iust Purgations*; For certaine it is, that *Purgers* doe many times great Hurt, if the Body bee not accommodated, both before, and after the *Purging*. The Hurt that they doe, for want of *Preparation* before *Purging*, is by the Sticking of the Humours, and their not comming faire away; Which causeth in the Body great Perturbations, and ill Accidents, during the *Purging*; And also, the diminishing, and dulling of the Working of the *Medicine* it selfe, that it purgeth not sufficiently, Therefore the worke of *Preparation* is double; To make the *Humours fluide*, and mature; And to make the *Passages* more open: For both those helpe to make the Humours passe readily. And for the former of these, *Sirrups* are most profitable; And for the Latter, *Apozumes*, or *Preparing Broaths*; *Cliysters* also helpe lest the *Medicine* stop in the Guts, and worke gripingly. But it is true, that *Bodies abounding* with *Humours*; And *fat Bodies*; And *Open Weather*; are *Preparatives* in themselves; because they make the Humours more fluide. But let a *Physitian* beware, how he purge after hard *Frosty Weather*, and in a *Leane Body*, without *Preparation*. For the Hurt, that they may doe after *Purging*; It is caused by the *Lodging* of some *Humours* in *ill Places*: For it is certaine, that there be *Humours*, which somewhere placed in the Body, are quiet, and doe little hurt; In other Places, (especially Passages,) doe much mischiefe. Therefore it is good, after *Purging*, to use *Apozumes*, and *Broths*, not so much *Opening* as those used before *Purging*, but *Abstersive* and

Mundifying Cliſters alſo are good to conclude with, to draw away the Reliques of the Humors, that may have deſcended to the *Lower Region* of the *Body*.

Experiment Solitary touching *Stanching of Bloud*. 66

Bloud is ſtanched divers wayes. Frſt by *Aſtringents*, and *Repercuſſive Medicines*. Secondly by *Drawing* of the *Spirits* and *Bloud inwards*; which is done by *Cold*; As *Iron* or a *Stone* laid to the neck doth ſtanch the Bleeding at the Noſe; Alſo it hath beene tryed, that the *Teſticles*, being put into ſharp Vineger, hath made a ſuddaine Receſſe of the Spirits, and ſtanched Bloud. Thirdly by the *Receſſe of the Bloud by Sympathy*. So it hath beene tried, that the part that bleedeth, being thruſt into the Body of a Capon, or Sheepe, new ript and bleeding, hath ſtanched *Bloud*; The *Bloud*, as it ſeemeth, ſucking and drawing up, by ſimilitude of ſubſtance, the *Bloud* it meeteth with, and ſo it ſelfe going backe. Fourthly by Cuſtome and Time; So the Prince of *Aurange*, in his firſt hurt, by the *Spaniſh Boy*, could finde no meanes to ſtanch the *Bloud*, either by *Medicine* or *Ligament*; but was faine to have the *Oriſice* of the *wound* ſtopped by *Mens Thumbes*, ſucceeding one another, for the ſpace at the leaſt of two Dayes; And at the laſt the bloud by *Cuſtome* onely retired. There is a fifth Way alſo in uſe, to let *Bloud* in an *Adverſe Part*, for a *Revulſion*.

Experiment Solitary touching *Change* of *Aliments* and *Medicines*. 67

IT helpeth, both in *Medicine*, and *Aliment*, to Change and not to continue the ſame *Medicine* & *Aliment* ſtill. The Cauſe is, for that *Nature* by continuall Uſe of any Thing, groweth to a *Sacietie*, and *Dulneſſe*, either of *Appetite*, or *Working*. And we ſee that *Aſſuetude* of *Things Hurtfull* doth make them leeſe their force to Hurt; As *Poyſon*, which with uſe ſome have brought themſelves to brooke. And therefore it is no marvaile, though *Things helpfull* by *Cuſtome*, leeſe their force to Helpe, I count *Intermiſſion* almoſt the ſame thing with *Change*; For that, that hath beene intermitted, is after a ſort new.

Experiment Solitary touching *Diets*. 68

IT is found by Experience, that in *Diets of Guaiacum*, *Sarza*, and the like (eſpecially if they be ſtrict,) the *Patient* is more troubled in the beginning, than after continuance; Which hath made ſome of the more delicate Sort of patients, give them over in the middeſt; Suppoſing that if thoſe Diets trouble them ſo much at firſt, they ſhall not be able to endure them to the End. But the Cauſe is, for that all thoſe *Diets*, doe drie up *Humours*, *Rheumes*, and the like; And they cannot Drie up untill they have firſt attenuated; And while the *Humour* is attenuated, it is more Fluid, then it was before, and troubleth the Body a great deale more, untill it be dried up, and conſumed. And therefore *Patients* muſt expect a due time, and not check at them at the firſt.

Experiments in Conſort touching the *Production* of *Cold*.

THe *Producing* of *Cold* is a thing very worthy the Inquiſition; both for Uſe, & Diſcloſure of Cauſes. For *Heat* and

Cold

Cold are *Natures* two hands, whereby ſhee chiefly worketh: And *Heat* we have in readineſſe, in reſpect of the *Fire*; But for *Cold* wee muſt ſtaie till it commeth; or ſeeke it in deepe Caves, or high Mountaines: And when all is done, we cannot obtaine it in any great degree: For *Furnaces* of *Fire* are farr hotter, than a *Summers Sunne*; But *Vaults*, or *Hills* are not much Colder than a *Winters Froſt*.

69 The firſt *Meanes* of *Producing Cold*, is that which *Nature* preſenteth us withall; Namely the *Expiring* of *cold* out of the *Inward Parts of the Earth* in *Winter*, when the Sun hath no power to overcome it; the *Earth* being (as hath beene noted by ſome) *Primum Frigidum*. This hath beene aſſerted, as well by Ancient as by Moderne *Philoſophers*: It was the Tenet of *Parmenides*. It was the opinion of the *Author* of the diſcourſe in *Plutarch* (for I take it that booke was not *Plutarches* owne) *De primo Frigido*. It was the opinion of *Teleſius*, who hath renewed the *Philoſophy* of *Parmenides*, and is the beſt of the *Novelliſts*.

70 The ſecond *Cauſe* of *Cold* is the *Contact* of *Cold Bodies*; For *Cold* is Active and Tranſitive into Bodies Adjacent, as well as *Heat*: which is ſeene in thoſe things that are touched with *Snow* or *Cold water*. And therefore, whoſoever will be an *Inquirer* into *Nature*, let him reſort to a *Conſervatory* of *Snow* and *Ice*; Such as they *uſe for delicacy*, to coole Wine in Summer; Which is a Poore and Contemptible uſe, in reſpect of other uſes, that may bee made of ſuch *Conſervatories*.

71 The Third *Cauſe* is the *Primary Nature* of all *Tangible bodies*: For it is well to be noted, that all Things whatſoever (*Tangible*) are of themſelves *Cold*; Except they have an Acceſſory *Heat* by *fire*; *Life*; or *Motion*: For even the *Spirit* of *Wine*, or *Chymicall Oyles*, which are ſo hot in Operation, are to the firſt Touch, *Cold*; And *Aire* it ſelfe compreſſed, & Condenſed a little by blowing, is *Cold*.

72 The Fourth *Cauſe* is the *Denſity of the Body*; For all *Denſe Bodies* are *Colder* than moſt other *Bodies*, As *Mettals*, *Stone*, *Glaſſe*; And they are longer in *Heating* than *Softer Bodies*. And it is certaine, that *Earth*, *Denſe*, *Tangible*, hold all of the Nature of *Cold*. The Cauſe is, for that all *Matters Tangible* being *Cold* it muſt needs follow, that where the *Matter* is moſt Congregate, the *Cold* is the greater.

73 The Fifth *Cauſe* of *Cold*, or rather of increaſe and vehemence of *Cold*, is a *Quicke Spirit incloſed in a Cold Body*: As will appeare to any that ſhall attentively conſider of *Nature* in many Inſtances. Wee ſee *Nitre* (which hath a *Quicke Spirit*) is Cold; more *Cold* to the Tongue, than a Stone; So *Water* is *Colder* than *Oile*, becauſe it hath *a Quicker Spirit*; For all *Oile*, though it hath the Tangible Parts better digeſted than *water*, yet hath it a duller *Spirit*: So *Snow* is *Colder* than *water*, becauſe it hath *more Spirit* within it: So we ſee that *Salt* put to *Ice* (as in the producing of the *Artificiall Ice*) increaſeth the *Activity* of *Cold*: So ſome *Inſecta* which have

Spirit

Spirit of *Life*, as *Snakes*, and *Silkwormes*, are to the touch, *Cold*. So *Quick-silver* is the *Coldest* of Mettales, because it is *fullest of Spirit*.

74 The Sixth *Cause* of *Cold* is *the Chasing and Driving away of Spirits*, such as have some *Degree of Heat*: For the Banishing of the *Heat* must needs leave any Body *Cold*. This wee see in the Operation of *Opium*, and *Stupefactives*, upon the Spirits of living Creatures: And it were not amisse to trie *Opium*, by laying it upon the Top of a *Weather-glasse*, to see whether it will contract the *Aire*: But I doubt it will not succeed: For besides that the vertue of *Opium* will hardly penetrate thorow such a Body as Glasse, I conceive that *Opium*, and the like, make the *Spirits* fly rather by *Maglignity*, than by *Cold*.

75 Seventhly, the same *Effect* must follow upon the *Exhaling or Drawing out of the warme Spirits*, that doth upon the Flight of the Spirits. There is an Opinion, that the *Moone* is Magneticall of *Heat*, as the *Sun* is of *Cold* and *Moisture*: It were not amisse therefore to trie it, with *warme-waters*; The one exposed to the Beames of the *Moone*; the other with some Skreene betwixt the Beames of the *Moone* and the *water*; As we use to the *Sunne* for Shade; And to see whether the former will coole sooner. And it were also good to inquire, what other Meanes there may be, to draw forth the *Exile heat*, which is in the *Aire*; for that may bee a Secret of great Power to Produce *Cold weather*.

Experiments in Consort touching the *Version* and *Transmutation of Aire into water*.

WEe have formerly set downe the *Meanes of turning Aire into water*, in the *Experiment* 27. But because it is *Magnale Naturæ*; And tendeth to the subduing of a very great effect; And is also of Manifold use; we will adde some *Instances* in *Consort* that give light thereunto.

76 It is reported by some of the *Ancients*, that *Sailers* have used, every Night, to hang *Fleeces of wooll* on the sides of their *Ships*, the *wooll* towards the water; And that they have crushed fresh Water out of them, in the Morning, for their use. And thus much wee have tried, that a *Quantitie* of *wooll* tied loose together being let downe into a deepe *well*; And hanging in the *Middle*, some three Fathome from the water, for a night, in the Winter time; increased in weight, (as I now remember) to a fifth Part.

77 It is reported by one of the *Ancients*, that in *Lydia*, neare *Pergamus*, there were certaine *Worke-men*, in time of *warres* fled into *Caves*; And the Mouth of the *Caves* being stopped by the Enemies, they were famished. But long time after the dead Bones were found; And some Vessels which they had carried with them; And the vessels full of *water*; And that *Water*, thicker, and more towards Ice, than Common *water*: which is a Notable Instance of *Condensation*, and *Induration* by *Buriall under Earth*, (in Caves,) for long time; And of *version* also (as it should seeme,) of *Aire* into *Water*; if any of those vessels were Emptie. Trie therefore a small *Bladder* hung in *Snow*; And the like in *Nitre*; And the like

like in *Quick-silver*: And if you find the *Bladders* fallen, or shrunke; you may bee sure the *Aire* is condensed by the *Cold* of those *Bodies*; As it would bee in a *Cave* under *Earth*.

It is reported of very good credit, that in the *East-Indies*, if you set a Tub of *water* open in a Roome where *Cloves* are kept, it will be drawne dry in 24. houres; Though it stand at some distance from the *Cloves*. In the Countrey, they use many times, in deceit, when their *wooll* is new shorne, to set some Pailes of *water* by, in the same Roome; to increase the weight of the *wooll*. But it may bee, that the Heat of the *wooll*, remaining from the body of the Sheepe; or the Heat gathered by the lying close of the *wooll*, helpeth to draw the watry Vapour; But that is nothing to the *Version*. 78

It is Reported also credibly, that *wooll* new shorne, being laid casually upon a *Vessell* of *Verjuyce*, after some time, had drunke up a great part of the *Verjuyce*, though the Vessell were whole without any *Flaw*, and had not the Bung-hole open. In this *Instance*, there is (upon the by) to be noted, the *Percolation*, or *Suing* of the *Verjuyce* through the wood; For *Verjuyce* of it selfe would never have passed thorow the wood: So as, it seemeth, it must bee first in a kinde of Vapour, before it passe. 79

It is especially to bee noted, that the Cause, that doth facilitate the *Version* of *Aire* into *water*, when the *Aire* is not in grosse, but subtilly mingled with *Tangible Bodies*, is, (as hath beene partly touched before,) for that *Tangible Bodies* have an Antipathy with *Aire*; And if they finde any *Liquid Body*, that is more dense, neare them, they will draw it: And after they have drawne it, they will condense it more, and in effect incorporate it; For we see that a *Sponge*, or *wooll*, or *Sugar*, or a *woollen cloth*, being but put in part, in *water*, or *wine*, will draw the *Liquour* higher, and beyond the place: where the *water* or *wine* commeth. We see also, that *Wood*, *Lute-strings*, and the like, doe swell in *moist Seasons*: As appeareth by the *Breaking* of the *Strings*, the *Hard Turning* of the *Pegs*, and the *Hard drawing forth of Boxes*, and *Opening* of *Wainscot doores*; which is a kind of *Infusion*: And is much like to an *Infusion* in water, which will make wood to swell: As wee see in the Filling of the Chops of Boules by laying them in water. But for that part of these *Experiments*, which concerneth *Attraction*, we will reserve it to the proper *Title* of *Attraction*. 80

There is also a *Version of Aire into water*, seene in the *Sweating* of *Marbles*, and other *Stones*. And of *wainscot* before and in moist weather: This must be either by some *Moisture* the Body yeeldeth; Or else by the Moist Aire thickned against the hard body. But it is plaine, that it is the latter; For that wee see *wood painted with Oyle Colour*, will sooner gather drops in a moist Night, than *wood* alone: which is caused by the Smoothnesse and Closenesse; which letteth in no part of the Vapour, and so turneth it backe, and thickeneth it into Dew. We see also, that *Breathing* upon a *Glasse*, or Smooth body, giveth a Dew; And in *Frosty Mornings* (such as we call *Rime frosts*) you shall finde drops of Dew upon 81

the

the Inside of Glasse-windowes; And the *Frost* it selfe upon the ground is but a *Version* or *Condensation*, of the Moist vapours of the Night, into a watry substance: *Dewes* likewise, and *Raine*, are but the Returnes of Moist vapours Condensed; The Dew, by the *Cold* onely of the Sunnes departure, which is the gentler *Cold*; *Raines*, by the *Cold* of that, which they call the *Middle Region* of the *Aire*; which is the more violent *Cold*.

82 It is very probable (as hath beene touched) that that, which will turne *Water* into *Ice*, will likewise turne *Aire* Some Degree nearer unto *water*. Therefore trie the *Experiment* of the *Artificiall Turning water into Ice* (whereof we shall speake in another place) with *Aire* in place of *water*, and the *Ice* about it. And although it bee a greater Alteration to turne *Aire* into *water*, than *water* into *Ice*: yet there is this Hope, that by Continuing the *Aire* longer time, the effect will follow; For that Artificiall *Conversion* of *water* into *Ice*, is the worke of a few Houres; And this of *Aire* may be tried by a Moneths space, or the like.

Experiments in Consort touching *Induration of Bodies.*

INduration, or *Lapidification*, of Substances more soft, is likewise another degree of *Condensation*; And is a great *Alteration* in Nature. The Effecting and Alccelerating thereof is very worthy to bee inquired. It is effected by three Meanes. The first is by *Cold*; whose Property is to *Condense*, and constipate, as hath beene said. The Second is by *Heat*; which is not proper but by consequence; For the *Heat* doth attenuate; And by Attenuation doth send forth the Spirit and moister Part of a Body; And upon that, the more grosse of the Tangible Parts doe contract and serre themselves together; Both to Avoid *Vacuum* (as they call it;) And also to Munite themselves against the Force of the *Fire*, which they have suffered. And the Third is by *Assimilation*; when a Hard Body Assimilateth a Soft, being contiguous to it.

The Examples of *Induration*, taking them promiscuously, are many: As the Generation of *Stones* within the Earth, which at the first are but Rude Earth, or Clay: And so of *Mineralls*, which come (no doubt) at first, of Juyces Concrete, which afterward indurate: And so of *Porcellane*, which is an *Artificiall Cement*, buried in the Earth a long time: And so the Making of *Bricke*, and *Tile*: Also the Making of *Glasse*, of a certaine Sand, and Brake-Roots, and some other Matters: Also the *Exudations* of *Rock-Diamonds*, & *Coystall*, which harden

den with time: Also the *Induration* of *Bead-Amber*, which at first is a soft Substance; As appeareth by the *Flies*, & *Spiders*, which are found in it; And many more: But we will speake of them distinctly.

For *Indurations* by *Cold*, there bee few Trialls of it; For wee have no strong or intense *Cold* here on the Surface of the *Earth*, so neare the Beames of the Sunne, and the Heavens. The likeliest Triall is by *Snow*, and *Ice*; For as *Snow* and *Ice*, especially being holpen, and their *Cold* activated by *Nitre*, or *Salt*, will turne *water* into *Ice*, and that in a few houres; So it may be, it will turne *wood*, or *Stiffe Clay*, into *Stone*, in longer time. Put therefore, into a *Conserving Pit* of *Snow*, and *Ice*, (adding some quantity of *Salt*, and *Niter*,) a Peece of *Wood*, or a Peece of *Tough Clay*, and let it lye a Moneth, or more. 83

Another Triall is by *Metalline-waters*, which have virtuall *Cold* in them. Put therefore *wood*, or *Clay*, into *Smiths water*, or other *Metalline water*; And try whether it will not harden in some reasonable time. But I understand it, of *Metalline waters*, that come by Washing, or Quenching; And not of *Strong waters* that come by dissolution; for they are too Corrosive to consolidate. 84

It is already found, that there are some *Naturall Spring-waters*, that will Inlapidate *Wood*; So as you shall see one peece of *Wood*, whereof the Part above the *Water* shall continue *Wood*; And the Part under the *Water* shall be turned into a kinde of *Gravelly Stone*. It is likely those *Waters* are of some *Metalline Mixture*; But there would be more particular Inquiry made of them. It is certaine, that an *Egge* was found, having lien many yeeres in the bottome of a Moate, where the Earth had somewhat overgrowen it; And this Egge was comen to the Hardnesse of a *Stone*; And had the Colours of the white and yolke perfect: And the Shell shining in small graines like Sugar, or Alablaster. 85

Another Experience there is of *Induration* by *Cold*, which is already found; which is, that *Mettalls*, themselves are hardened by often *Heating* and *quenching* in *Cold water*: For *Cold* ever worketh most potently upon *Heat* precedent. 86

For *Induration* by *Heat*, it must be considered, that *Heat*, by the Exhaling of the Moister Parts, doth either harden the Body; As in *Bricks*, *Tiles*, &c; Or if the *Heat* be more fierce, maketh the grosser part it selfe, Runne and Melt; As in the making of ordinary *Glasse*; And in the *Vitrification* of *Earth*, (As we see in the Inner Parts of *Furnaces*;) And in the *Vitrification* of *Brick*; And of *Mettalls*. And in the former of these, which is the Hardening by baking, without Melting, the *Heat* hath these degrees; First it *Indurateth*; and then maketh *Fragile*; And lastly it doth *Incinerate* and *Calcinate*. 87

But if you desire to make an *Induration* with *Toughnesse*, and lesse Fragility; A middle way would be taken; Which is that which *Aristotle* hath wel noted; But would be throughly verified. It is, to decoct *Bodies* in *water*, 88

water, for two or three dayes; But they must bee such Bodies, into which the *Water* will not enter; As *Stone*, and *Metall*. For if they be Bodies into which the *Water* will enter, then long Seething, will rather Soften than indurate them; As hath been tried in *Eggs* &c. Therefore, Softer *Bodies* must bee put into Bottles; And the Bottles hung into Water seething, with the mouths open, above the *Water*; that no *Water* may get in; For by this Meanes, the virtuall *Heat* of the *Water* will enter; And such a *Heat*, as will not make the Body aduſt, or fragile; But the Substance of the *Water* will bee shut out. This *Experiment* wee made; And it sorted thus. It was tried with a peece of *Free-Stone*, and with *Pewter*, put into the *Water* at large. The *Free-Stone* we found received in some *Water*; For it was softer, and easier to scrape, than a peece of the same *Stone* kept drie. But the *Pewter* into which no *water* could enter, became more white, and liker to Silver, and lesse flexible, by much. There were also put into an Earthen Bottle, placed as before, a good Pellet of *Clay*, a Peece of *Cheese*, a Peece of *Chalke*, & a Peece of *Free-stone*. The *Clay* came forth almost of the Hardnesse of *Stone*; The *Cheese* likewise very hard, and not well to be cut: The *Chalke* and the *Free-Stone* much harder than they were. The colour of the *Clay* inclined not a whit to the Colour of *Bricke*, but rather to white, as in ordinary Drying by the Sunne. Note, that all the former Trials were made by a Boyling upon a good hot Fire, renewing the *water* as it consumed, with other hot *water*; But the Boyling was but for twelve houres only; And it is like that the Experiment would have beene more effectuall, if the Boyling had beene for two or three daies, as we prescribed before.

89 As touching *Assimilation*, (for there is a degree of *Assimilation* even in Inanimate bodies) wee see Examples of it in some *Stones* in *Clay-Grounds*, lying near to the top of the Earth, where *Pebble* is, In which you may manifestly see divers *Pebbles* gathered together, and a Crust of *Cement* or *Stone* betweene them, as hard as the *Pebbles* themselves: And it were good to make a Triall of purpose, by taking *Clay*, and putting in it divers *Pebble-Stones*, thicke set, to see whether in continuance of time, it will not be harder than other *Clay* of the same lumpe, in which no *Pebbles* are set. Wee see also in Ruines of old Walls, especially towards the Bottome, the *Morter* will become as hard as the *Bricke*; we see also, that the *wood* on the sides of *Vessels* of *Wine*, gathereth a Crust of *Tartar*, harder than the *wood* it selfe; And Scales likewise grow to the *Teeth*, harder than the *Teeth* themselves.

90 Most of all, *Induration* by *Assimilation* appeareth in the Bodies of *Trees*, and *living Creatures*: For no Nourishment that the *Tree* receiveth, or that the *living Creature* receiveth, is so hard as *Wood*, *Bone*, or *Horne*, *&c.* but is *Indurated* after by *Assimilation*.

Experiment Solitary touching the *Version of Water into Aire.*

91 THe Eye of the understanding, is like the Eye of the Sense: For as you may see great Objects through smal Cranies, or Levels: So you may

may see great *Axiomes* of *Nature*, through small and Contemptible *Instances*. The *Speedy Depredation* of *Aire* upon *watry Moisture*, and *Version* of the same into *Aire*, appeareth in nothing more visible, than in the sudden Discharge, or vanishing, of a little *Cloud* of *Breath*, or *Vapour*, from *Glasse*, or the *Blade* of a *Sword*, or any such Polished Body; Such as doth not at all Detaine, or Imbibe the Moisture; For the Mistinesse scattereth and breaketh up suddenly. But the like *Cloud*, if it were *Oyly*, or *Fatty*, will not discharge; Not because it sticketh faster; But because *Aire* preyeth upon *water*; And *Flame*, and *Fire*, upon *Oyle*; And therefore, to take out a Spot of Grease, they use a *Coale* upon browne Paper; because *Fire* worketh upon Grease, or *Oyle*, as *Aire* doth upon *Water*. And we see *Paper oyled*, or *Wood oyled*, or the like, last long moist; but *Wet* with *Water*, drie, or putrifie sooner. The Cause is, for that *Aire* meddleth little with the *Moisture* of *Oyle*.

Experiment Solitary touching the *Force of Vnion*. 92

THere is an Admirable demonstration, in the same trifling *Instance* of the *little Cloud* upon *Glasse*, or *Gemmes*, or *Blades* of *Swords*, of the *Force of Vnion*, even in the least Quantities, and weakest Bodies, how much it conduceth to Preservation of the present Forme; And the Resisting of a New. For marke well the discharge of that *Cloud*; And you shall see it ever breake up, first in the Skirts, and last in the middest. We see likewise, that much *Water* draweth forth the Juyce of the Body Infused; But little water, is imbibed by the Body: And this is a Principall Cause, why in Operation upon *Bodies*, for their *Version* or *Alteration*, the Triall in great Quantities, doth not answer the Triall in small; And so deceiveth many; For that (I say) the greater Body, resisteth more any Alteration of Forme, and requireth farre greater Strength in the Active Body, that should subdue it.

Experiment Solitary touching the *Producing of Feathers and Haires of divers Colours*. 93

WE have spoken before, in the fifth *Instance*, of the Cause of *Orient Colours*, in *Birds*; which is by the Fineness of the Strainer; we will now endevour to reduce the same *Axiome* to a *Worke*. For this Writing of our *Sylva Sylvarum*, is (to speake properly) not *Naturall History*, but a high kinde of *Naturall Magicke*. For it is not a Description onely of Nature, but a Breaking of Nature, into great and strange Workes. Trie therefore, the Anointing over of *Pigeons*, or other *Birds*, when they are but in their downe; Or of *Whelps*, cutting their Haire as short as may be; Or of some other Beast; with some oyntment, that is not hurtfull to the Flesh; And that will harden, and sticke very close; And see whether it will not alter the Colours of the *Feathers*, or *Haire*. It is received, that the *Pulling* off, the first *Feathers* of *Birds*, cleane, will make the new come forth *white*: And it is certaine, that *White* is a penurious Colour, and where Moisture is scant. So *Blew Violets*, and other *Flowers*, if they be starved, turne Pale and *white*; *Birds*, and *Horses*, by Age, or Scarres, turne *white*: And the *Hoare Haires* of Men, come by the same reason. And therefore in *Birds*, it is very likely, that the *Feathers* that

come first, will be many times of divers Colours, according to the Nature of the *Bird*; For that the Skin is more porous; But when the Skin is more shut, and close, the Feathers will come *white*. This is a good *Experiment*, not onely for the Producing of *Birds* and *Beasts* of strange Colours; but also, for the Disclosure of the Nature of *Colours* themselves; which of them require a finer Porositie, and which a grosser.

Experiment Solitary touching *the Nourishment of Living Creatures before they bee brought forth.*

94

IT is a worke of Providence, that hath beene truly observed by some; That the *Yolke* of the *Egge*, conduceth little to the *Generation* of the *Bird*; But onely to the *Nourishment* of the same: For if a *Chicken* be opened, when it is new hatched; you shall finde much of the *Yolke* remaining. And it is needfull, that *Birds*, that are shaped without the Females Wombe; have in the *Egge*, as well Matter of Nourishment, as Matter of generation for the Body. For after the *Egge* is laid, and severed from the Body of the *Hen*; It hath no more Nourishment from the *Hen*; But onely a quickening *Heat* when shee sitteth. But Beasts, and Men need not the matter of Nourishment within themselves; Because they are shaped within the Wombe of the Female, and are Nourished continually from her Body.

Experiments in Consort touching *Sympathy and Antipathy for Medicinall use.*

95

IT is an Inveterate and received Opinion, that *Cantharides* applyed to any Part of the Body, touch the *Bladder*, and exulcerate it, if they stay on long. It is likewise Received, that a kinde of *Stone*, which they bring out of the *West Indies*, hath a peculiar force to move Gravell, and to dissolve the *Stone*; In so much, as laid but to the wrest, it hath so forcibly sent downe Gravell, as Men have beene glad to remove it; It was so violent.

96

It is received and confirmed by daily Experience, that the *Soales* of the *Feet* have great Affinitie with the *Head*, and the *Mouth* of the *Stomach*: As we see, *Going wet-shod*, to those that use it not, affecteth both: Applications of *hot Powders* to the *Feet* attenuate first, and after drie the *Rheume*: And therefore a *Physitian*, that would be Mysticall, prescribeth, for the Cure of the *Rheume*, that a Man should walke Continually upon a *Camomill Alley*; Meaning, that he should put *Camomill* within his Sockes. Likewise *Pigeons bleeding*, applyed to the *Soales* of the *Feet*, ease the *Head*: And *Soporiferous Medicines* applyed unto them, provoke *Sleepe*.

97

It seemeth, that as the *Feet* have a Sympathy with the *Head*; So the *Wrests* and *Hands*, have a Sympathy with the *Heart*; We see the Affects and Passions of the *Heart*, and *Spirits*, are notably disclosed by the *Pulse*: And it is often tried, that Juyces of *Stock-Gilly-Flowers*, *Rose-Campian*, *Carlicke*, and other things; applyed to the *Wrests*, and renewed; have cured long *Agues*. And I conceive, that washing with certaine *Liquours*, the *Palmes* of the *Hands*, doth much good: And they doe well in *Heats* of *Agues*, to hold in the Hands, *Egges of Alablaster*, and *Balls* of *Crystall*.

Of these things wee shall speake more, when wee handle the Title *of* Sympathy *and* Antipathy, *in the proper Place.*

The

Experiment Solitary touching the *Secret Processes of Nature.* 98

THe Knowledge of man (hitherto) hath beene determined by the View, or Sight; So that whatsoever is Invisible, either in respect of the *Fineneſſe of the Body* it ſelfe; Or the *Smalneſſe of the Parts*; Or of the *Subtiltie of the Motion*; is little inquired. And yet theſe be the Things that Governe Nature principally; And without which, you cannot make any true *Analyſis* and Indication of the Proceedings of Nature. The *Spirits* or *Pneumaticals*, that are in all *Tangible Bodies*, are ſcarce knowne. Sometimes they take them for *Vacuum*; whereas they are the moſt Active of Bodies. Sometimes they take them for *Aire*; From which they differ exceedingly, as much as Wine from Water; And as Wood from Earth. Sometimes they will have them to be *Naturall Heat*, or a *Portion* of the *Element of Fire*; Whereas ſome of them are crude, and cold. And ſometimes they will have them to be the *Vertues* and *Qualities* of the *Tangible Parts*, which they ſee; whereas they are Things by themſelves. And then, when they come to Plants and living Creatures, they call them *Soules*. And ſuch Superficiall Speculations they have; Like Proſpectives, that ſhew things inward, when they are but Paintings. Neither is this a Queſtion of Words, but infinitely materiall in *Nature*. For *Spirits* are nothing elſe but a *Naturall Body*, rarified to a Proportion, and included in the *Tangible Parts* of *Bodies*, as in an Integument. And they be no leſſe differing one from the other, than the *Denſe* or *Tangible Parts*: And they are in all *Tangible Bodies* whatſoever, more or leſſe: And they are never (almoſt) at reſt: And from them, and their *Motions*, principally proceed *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, *Putrefaction*, *Vivification*, and moſt of the Effects of *Nature*: For, as we have figured them in our *Sapientiâ Veterum*; in the *Fable* of *Proſerpina*, you ſhall in the Infernall Regiment heare little Doings of *Pluto*, but moſt of *Proſerpina*: For *Tangible Parts* in *Bodies* are Stupide things; And the *Spirits* doe (in effect) all. As for the differences of *Tangible Parts* in *Bodies*, the induſtry of the *Chymiſts* hath given ſome light, in diſcerning by their Separations, the *Oily*, *Crude*, *Pure*, *Impure*, *Fine*, *groſſe Parts* of *Bodies*, and the like. And the *Phyſitians* are content to acknowledge, that *Herbs* and *Drugs* have divers Parts; As that *Opium* hath a Stupefactive Part, and a Heating Part; The one moving Sleepe, the other a Sweat following; And that *Rubarb* hath Purging Parts, and Aſtringent Parts, &c. But this whole *Inquiſition* is weakly and negligently handled. And for the more ſubtill differences of the *Minute Parts*, and the Poſture of them in the Body, (which alſo hath great Effects) they are not at all touched: As for the *Motions* of the *Minute Parts of Bodies*, which doe ſo great Effects, they have not beene obſerved at all; becauſe they are Inviſible, and incurre not to the Eye; but yet they are to be deprehended by Experience: As *Democritus* ſaid well, when they charged him to hold, that the World was made of ſuch little Moats, as were ſeene in the Sunne; *Atomus* (ſaith he) *neceſſitate Rationis & Experientiæ eſſe convincitur*; *Atomum enim nemo unquam vidit*. And therefore the Tumult in the Parts of Solide Bodies, when they are compreſſed, which is the Cauſe of all

Flight of Bodies thorow the Aire, and of other *Mechanicall Motions*, (as hath beene partly touched before, and ſhall be throughly handled in due place,) is not ſeene at all. But nevertheleſſe, if you know it not, or enquire it not attentively and diligently, you ſhall never be able to diſcerne, and much leſſe to produce, a Number of *Mechanicall Motions*. Againe, as to the *Motions Corporall*, within the Encloſures of Bodies, whereby the effects (which were mentioned before) paſſe between the *Spirits*, and the *Tangible Parts*; (which are, *Arefaction*, *Colliquation*, *Concoction*, *Maturation*, &c.) they are not at all handled. But they are put of by the Names of *Vertues*, and *Natures*, and *Actions*, and *Paſſions*, and ſuch other *Logicall* Words.

Experiment Solitary touching the *Power of Heat*.

99

IT is certaine, that of all *Powers* in *Nature*, *Heat* is the chiefe; both in the Frame of *Nature*, and in the workes of *Art*. Certaine it is likewiſe, that the Effects of *Heat*, are moſt advanced, when it worketh upon a Body, without loſſe or diſſipation of the Matter; for that ever betrayeth the Account. And therefore it is true, that the power of *Heat* is beſt perceived in *Diſtillations*, which are performed in cloſe Veſſels, and Receptacles. But yet there is a higher Degree; For howſoever *Diſtillations* doe keepe the Body in Cells, and Cloyſters, without Going abroad, yet they give ſpace unto Bodies to turne into Vapour; To returne into Liquour; And to Separate one part from another. So as *Nature* doth Expatiate, although it hath not full Libertie: whereby the true and Ultime Operations of *Heat* are not attained. But if *Bodies* may be altered by *Heat*, and yet no ſuch Reciprocation of *Rarefaction*, and of *Condenſation*, and of *Separation*, admitted; then it is like that this *Protean* of *Matter*, being held by the Sleeves, will turne and change into many *Metamorphoſes*. Take therefore a *Square veſſell* of *Iron*, in forme of a Cube, and let it have good thicke and ſtrong Sides. Put into it a Cube of *Wood*, that may fill it as cloſe as may be; And let it have a Cover of Iron, as ſtrong (at leaſt) as the Sides; And let it be well Luted, after the manner of the *Chymiſts*. Then place the *Veſſell* within burning *Coales*, kept quicke kindled, for ſome few houres ſpace. Then take the *Veſſell* from the *Fire*, and take off the Cover, and ſee what is become of the *Wood*. I conceive that ſince all *Inflammation*, and *Evaporation* are utterly prohibited, and the *Body* ſtill turned upon it Selfe, that one of theſe two Effects will follow: Either that the *Body* of the *Wood* will be turned into a kinde of *Amalagma*, (as the *Chymiſts* call it;) Or that the Finer Part will be turned into *Aire*, and the Groſſer ſticke as it were baked, and incruſtate upon the Sides of the *Veſſell*; being become of a Denſer Matter, than the *Wood* it ſelfe, Crude. And for another Triall, take alſo *water*, and put it in the like Veſſell, ſtopped as before; But uſe a gentler *Heat*, and remove the Veſſell ſometimes from the Fire; And againe, after ſome ſmall time, when it is Cold, renue the *Heating* of it: And repeat this *Alteration* ſome few times: And if you can once bring to paſſe, that the *water*, which is one of the Simpleſt of Bodies, be changed in Colour, Odour, or Taſte,

after

after the manner of Compound Bodies, you may be ſure that there is a great Worke wrought in Nature, and a Notable Entrance made into ſtrange Changes of Bodies, and productions: And alſo a Way made, to doe that by Fire, in ſmall time, which the Sunne and Age doe in long time. But of the Admirable Effects of this *Diſtillation in Cloſe*, (for ſo we call it it) which is like the *wombes* and *Matrices* of living creatures, where nothing Expireth, nor Separateth; Wee will ſpeake fully, in the due place; Not that we Aime at the making of *Paracelſus Pigmey's*; Or any ſuch Prodigious Follies; But that we know the Effects of *Heat* will be ſuch, as will ſcarce fall under the Conceit of Man; If the force of it be altogether kept in.

Experiment Solitary, touching the *Impoſſibilitie* of *Annihilation*. 100

THere is nothing more Certaine in Nature, than that it is impoſſible for any *Body*, to be utterly *Annihilated*; But that, as it was the worke of the Omnipotency of *God*, to make *Somewhat* of *Nothing*; So it requireth the like Omnipotency, to turne *Somewhat* into *Nothing*. And therefore it is well ſaid, by an Obſcure Writer of the *Sect* of the *Chymiſts*; That there is no ſuch way to effect the Strange *Tranſmutations* of *Bodies*, as to endevour and urge by all meanes, the *Reducing* of them to *Nothing*. And herein is contained alſo a great Secret of Preſervation of Bodies from Change; For if you can prohibit, that they neither turne into *Aire*, becauſe no *Aire* commeth to them; Nor goe into the *Bodies Adjacent*, becauſe they are utterly Heterogeneall; Nor make a *Round* and *Circulation* within themſelves; they will never change, though they be in their Nature never ſo Periſhable, or Mutable. Wee ſee, how *Flies*, and *Spiders*, and the like, get a *Sepulcher* in *Amber*, more Durable, than the *Monument*, and *Embalming* of the *Body* of any *King*. And I conceive the like will be of *Bodies* put into *Quick-ſilver*. But then they muſt be but thinne; As a leafe, or a peece of Paper, or Parchment; For if they have a greater Craſſitude, they will alter in their owne Body, though they ſpend not. But of this, We ſhall ſpeake more, when wee handle the *Title* of *Conſervation* of *Bodies*.

Experiments Solitary, touching the Loss of Quicksilver.

100

NATVRALL HISTORIE.

II. Century.

MVSICKE in the *Practice*, hath beene well pursued; And in good Variety; But in the *Theory*, and especially in the *Reelding* of the *Causes* of the *Practique*, very weakly; being reduced into certaine Mysticall Subtilties, of no use, and not much Truth. Wee shall therefore, after our manner, joyne the *Contemplative* and *Active Part* together.

Experiments in Consort touching *Musicke*.

All *Sounds*, are either *Musicall Sounds*, which we call *Tones*, Whereunto there may be an *Harmony*; which *Sounds* are ever *Equall*; As *Singing*, the *Sounds of Stringed*, and *Wind-Instruments*, the *Ringing of Bells*, &c. Or *Immusicall Sounds*; which are ever *Vnequall*; Such as are the *Voyce in Speaking*, all *Whistlings*; all *Voices of Beasts*, *and Birds*, (except they bee *Singing Birds*;) all *Percussions*, of *Stones*, *Wood*, *Parchment*, *Skins* (as in *Drummes*;) and infinite others. 101

The *Sounds* that produce *Tones*, are ever from such *Bodies*, as are in their Parts and Pores *Equall*; As well as the *Sounds* themselves are *Equall*; And such are the *Percussions* of *Metall*, as in *Bells*; Of *Glasse*, as in the Fillipping of a *Drinking Glasse*; Of *Aire*, as in *Mens voices whilest they Sing*, in *Pipes*, *Whistles*, *Organs*, *Stringed Instruments*, &c. And of *Water*, as in the *Nightingale-Pipes* of *Regalls*, or *Organs*, and other *Hydraulickes*; which 102

which the *Ancients* had, and *Nero* did so much esteeme, but are now lost. And if any Man thinke, that the *String* of the *Bowe*, and the *String* of the *Viall*, are neither of them *Equall Bodies*; And yet produce *Tones*; he is in an error. For the *Sound* is not created between the *Bowe* or *Plectrum*, and the *String*; But between the *String* and the *Aire*; No more than it is between the *Finger* or *Quill*, & the *String*, in other *Instruments*. So there are (in effect) but three *Percussions* that create *Tones*; *Percussions* of *Metalls*, (comprehending *Glasse*, and the like;) *Percussions* of *Aire*; and *Percussitions* of *Water*.

103 The *Diapason* or *Eight* in *Musicke* is the sweetest *Concord*; Insomuch, as it is in effect an *Vnison*; As wee see in *Lutes*, that are strung in the Base *Strings* with two strings, one an *Eight* above another; Which make but as one *Sound*. And every *Eight Note* in Ascent, (as from *Eight* to *Fifteene* from *Fifteene* to *twenty two*, and so *in infinitum*,) are but *Scales of Diapason*. The *Cause* is darke, and hath not beene rendred by any; And therfore would be better contemplated. It seemeth that Aire, (which is the Subject of *Sounds*) in *Sounds* that are not *Tones*, (which are all *unequall*, as hath been said) admitteth much Varietie; As wee see in the *Voices* of *Living Creatures*; And likewise in the *Voices* of severall *Men*; (for we are capable to discerne severall *Men* by their *Voices*;) And in the *Coniugation of Letters*, whence *Articulate Sounds* proceed; Which of all others are most various. But in the Sounds which we call *Tones*, (that are ever *Equall*) the *Aire* is not able to cast it selfe into any such varietie; But is forced to recurre into one and the same Posture or Figure, only differing in Greatnesse and Smalnesse. So we see *Figures* may be made of lines, Crooked and Straight, in infinite Varietie, where there is Inequalitie; But *Circles*, or *Squares*, or *Triangles Equilaterall*, (which are all *Figures*, of Equall lines) can differ but in Greater, or Lesser.

104 It is to be noted (the rather lest any Man should thinke, that there is any thing in this *Number* of *Eight*, to create the *Diapason*), that this Computation of *Eight*, is a thing rather receiued, than any true Computation. For a true Computation ought euer to bee, by Distribution into equall Portions. Now there be nitervenient in the *Rise* of *Eight* (in *Tones*) otw *Beemolls*, or *Half-notes*; So as if you diuide the *Tones* equally, the *Eight* is but *Seuen* whole and equall *Notes*; And if you subdiuide that into *Halfe Notes*, (as it is in the Stops of a *Lute*), it maketh the *Number* of *thirteene*,

105 Yet this is true; That in the ordinarie Rises and Falls of the *Voice* of *Man*, (not measuring the *Tone* by whole Notes, and halfe Notes, which is the Equall Measure;) there fall out to be two Beemols (as hath beene said) betweene the *Vnison* and the *Diapason*: And this Varying is naturall. For if a Man would endeuour to raise or fall his *Voice*, still by *Half-Notes*, like the Stops of a *Lute*; or by whole *Notes* alone, without *Halfes*; as farre as an *Eight*; he will not be able to frame his *Voice* unto it. Which sheweth, that after every three whole *Notes* Nature requireth, for all Harmonicall use, one *halfe Note* to be intreposed.

106 It is to be considered, that whatsoever Vertue is in *Numbers*, for

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Conducing to Concent of *Notes*, is rather to bee ascribed to the *Ante-Number*, than to the *Entire Number*; As namely, that the Sound returneth after *Six*, or after *Twelue*; So that the *Seventh*, or the *Thirteenth* is not the Matter, but the *Sixth*, or the *Twelfth*; And the *Seventh* and the *Thirteenth* are but the limits and Bounda ies of the *returne*.

The *Concords* in *Musick* which are *Perfect*, or *Semiperfect*, betweene the *Vnison*, and the *Diapason*, are the *Fifth*, which is the most *Perfect*; the *Third* next; And the *Sixth* which is more harsh: And as the Ancients esteemed, and so do my selfe and some Other yet, the *Fourth* which they call *Diatessaron*. As for the *Tenth*, *Twelfth*, *Thirteenth*, and so *in Infinitum*; they be but *Recurrences* of the Former; viz. of the *Third*, the *Fifth*, and the *Sixth*; being an *Eight* respectively from them. 107

For *Discords*, the *Second*, and the *Seventh*, are of all others the most odious, in *Harmony*, to the *Sense*; wherof the One is next above the *Vnision*, the Other next under the *Diapason*: which may shew, that *Harmony* requireth a competent distance of *Notes*. 108

In *Harmony*, if there be not a *Discord* to the *Base*, it doth not disturbe the *Harmony*, though there bee a *Discord* to the *Higher Parts*; So the *Discord* be not of the Two that are Odious; And therfore the ordinary *Concent* of *Foure Parts* consisteth of an *Eight*, a *Fifth*, and a *Third* to the *Base*: But that *Fifth* is a *Fourth* to the *Treble*, and the *Third* is a *Sixth*. And the *Cause* is, for that the *Base* striking more Aire, doth overcome and drowne the *Treble*, (unlesse the *Discord* bee very Odious;) And so hideth a small Imperfection. For wee see, that in one of the *lower Strings* of a *Lute*, there soundeth not the Sound of the *Treble*, nor any *Mixt Sound*, but onely the *Sound* of the *Base*. 109

Wee have no *Musick* of *Quarter-Notes*; And it may be, they are not capable of *Harmony*; For wee see the *Halfe-Notes* themselves doe but interpose sometimes. Nevertheless wee have some *Slides* or *Relishes*, of the Voice, or Strings, as it were continued without *Notes*, from one *Tone* to another, rising or falling, which are delightfull. 110

The Causes of that which is *Pleasing*, or *Ingrate* to the *Hearing*, may receive light by that, which is *Pleasing* or *Ingrate* to the *Sight*. There bee two Things Pleasing to the Sight, (leaving *Pictures*, and *Shapes* aside, which are but Secondary Objects; And please or displease but in Memory;) these two are, *Colours*, and *Order*. The pleasing of *Colour* symbolizeth with the *Pleasing* of any *Single Tone* to the *Eare*; But the Pleasing of *Order* doth symbolize with *Harmony*. And therefore wee see in *Garden-knots*, and the *Frets of Houses*, and all equall and well-answering *Figures*, (as *Globes*, *Pyramides*, *Cones*, *Cylenders*, &c.) how they please; whereas *unequall Figures* are but Deformities. And both these *Pleasures*, that of the *Eye*, and that of the *Eare*, are but the Effects of *Equality*; *Good Proportion*, or *Correspondence*: So that (out of *Question*,) *Equality*, and *Correspondence*, are the *Causes* of *Harmony*. But to finde the *Proportion* of that *Correspondence*, is more abstruse; whereof notwithstanding we shall speake somewhat, (when wee handle *Tones*,) in the generall Enquiry of *Sounds*. 111

Tones

112 *Tones* are not so apt altogether to procure *Sleep*, as some other *Sounds*; As the *Wind*, the *Purling of Water*, *Humming of Bees*, a *Sweet Voice* of one that readeth, &c. The *Cause* whereof is, for that *Tones*, because they are Equall, and slide not, doe more strike and erect the Sense, than the other. And Overmuch Attention hindreth *Sleepe*.

113 There be in *Musick* certaine *Figures*, or *Tropes*; almost agreeing with the *Figures* of *Rhetoricke*; And with the *Affections* of the *Minde*, and other *Senses*. First, the *Division* and *Quavering*, which please so much in *Musick*, have an Agreement with the *Glittering* of *Light*; As the *Moone-Beames* playing upon a Wave. Againe, the *Falling* from a *Discord* to a *Concord*, which maketh great Sweetnesse in *Musick*, hath an Agreement with the *Affections*, which are reintegrated to the better, after some dislikes: It agreeth also with the *Taste*, which is soone glutted with that which is sweet alone. The *Sliding from the Close or Cadence*, hath an Agreement with the *Figure* in *Rhetoricke*, which they call *Præter Expectatum*; For their is a Pleasure even in *Being deceived*. The *Reports*, and *Fuges*, have an Agreement with the *Figures* in *Rhetorick*, of *Repetition*, and *Traduction*. The *Tripla's*, and *Changing of times*, have an Agreement with the *Changes of Motions*; As when *Galliard Time*, and *Measure Time*, are in the *Medley* of one *Dance*.

114 It hath beene anciently held, and observed, that the *Sense of Hearing*, and the *Kinds of Musick*, have most Operation upon *Manners*; As to Incourage Men, and make them warlike; To make them Soft and Effeminate; To make them Grave; To make them Light; To make them Gentle and inclind to Pitty, &c. The *Cause* is, for that the *Sense of Hearing* striketh the *Spirits* more immediatly, than the other *Senses*; And more incorporeally than the *Smelling*: For the *Sight*, *Taste*, and *Feeling*, have their Organs, not of so present and immediate Accesse to the *Spirits*, as the *Hearing* hath. And as for the *Smelling*, (which indeed worketh also immediatly upon the *Spirits*, and is forcible while the Object remaineth,) it is with a communication of the Breath, or Vapour of the *Object Odorate*: But *Harmony* entring easily, and Mingling not at all, and Comming with a manifest Motion; doth by Custome of often Affecting the *Spirits*, and Putting them into one kinde of Posture, alter not a little the Nature of the *Spirits*, even when the Object is removed. And therefore we see, that *Tunes* and *Aires*, even in their owne Nature, have in themselves some Affinity with the *Affections*; As there bee *Merry Tunes*, *Dolefull Tunes*, *Solemne Tunes*; *Tunes inclining Mens mindes to Pitty*; *Warlike Tunes*; &c. So as it is no Marvell, if they alter the *Spirits*; considering that *Tunes* have a Predispositon to the *Motion* of the *Spirits* in themselves. But yet it hath been noted, that though this variety of *Tunes*, doth dispose the *Spirits* to variety of Passions, conforme unto them; yet generally, *Musick* feedeth that disposition of the *Spirits* which it findeth. Wee see also that severall *Aires*, and *Tunes*, doe please severall *Nations*, and *Persons*, according to the Sympathy they have with their *Spirits*.

Experiments in Consort touching *Sounds*; and first touching the *Nullity, and Entity of Sounds*.

Perspective hath been with some diligence inquired; And so hath the *Nature of Sounds*, in some sort, as far as concerneth *Musick*. But the *Nature of Sounds* in generall, hath beene superficially observed. It is one of the subtilleſt Peeces of Nature. And beſides, I practiſe, as I doe adviſe; which is, after long Inquiry of Things, Immerſe in Matter, to interpoſe ſome Subject, which is Immateriate, or leſſe Materiate; Such as this of *Sounds*; To the end, that the *Intellect* may be Rectified, and become not Partiall.

It is firſt to be conſidered, what *Great Motions* there are in Nature, which paſſe without *Sound*, or *Noiſe*. The *Heavens* turne about, in a moſt rapide Motion, without *Noiſe* to us perceived; Though in ſome *Dreames* they have been ſaid to make an excellent *Muſicke*. So the *Motions* of the *Comets*, and *Fiery Meteors* (as *Stella Cadens*, &c.) yeeld no *Noiſe*. And if it bee thought, that it is the Greatneſſe of diſtance from us, whereby the *Sound* cannot bee heard; Wee ſee that *Lightnings*, *and Coruſcations*, which are neere at hand, yeeld no *Sound* neither. And yet in all theſe, there is a Percuſſion and Diviſion of the *Aire*. The *Windes* in the *Vpper Region* (which move the *Clouds* above (which wee call the *Racke*) and are not perceived below) paſſe without *Noiſe*. The *lower Windes* in a Plaine, except they be ſtrong, make no *Noiſe*; But amongſt Trees, the *Noiſe*, of ſuch *Windes* will be perceived. And the *windes* (generally) when they make a *Noiſe*, doe ever make it unequally, Riſing and Falling, and ſometimes (when they are vehement,) Trembling at the Height of their Blaſt, *Raine*, or *Haile* falling, (though vehemently,) yeeldeth no *Noiſe*, in paſſing through the *Aire*, till it fall upon the Ground, Water, Houſes, or the like. *Water* in a *River* (though a ſwift Streame) is not heard in the Channell, but runneth in Silence, if it be of any depth; But the very *Streame* upon *Shallowes*, of Gravell, or Pebble, will bee heard. And *Waters*, when they beat upon the Shore, or are ſtraitned, (as in the falls of Bridges;) Or are daſhed againſt themſelves, by *windes*, give a Roaring *Noiſe*. Any *peece of Timber*, or *Hard Body*, being thruſt forwards by another Body Contiguous, without knocking, giveth no *Noiſe*. And ſo *Bodies* in weighing, one upon another, though the *upper Body* preſſe the *lower Body* downe, make no *Noiſe*. So the *Motion* in the *Minute Parts* of any *Solide Body*, (which is the Principall Cauſe of *Violent Motion*, though unobſerved;) paſſeth without *Sound*; For that *Sound*, that is heard ſometimes, is produced onley by the Breaking of the *Aire*; And not by the Impulſion of the Parts. So it is manifeſt; That where the Anteriour Body giveth way, as faſt as the Poſteriour commeth on, it maketh no *Noiſe*; bee the *Motion* never ſo great, or ſwift.

115

Aire open, and at *large*, maketh no *Noiſe*, except it bee ſharply percuſſed; As in the *Sound* of a String, where *Aire* is percuſſed by a hard,

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and ſtiffe Body; And with a ſharp looſe; For if the String be not ſtrained, it maketh no *Noiſe*. But where the *Aire is pent*, and ſtraitned, there Breath, or other Blowing, (which carry but a gentle Percuſſion,) ſuffice to create *Sound*; As in *Pipes*, and *winde-Inſtruments*. But then you muſt note, that in *Recorders*, which goe with a gentle Breath, the *Concave* of the *Pipe*, were it not for the *Fipple*, that ſtraitneth the Aire, (much more than the *Simple Concave*;) would yeeld no *Sound*. For as for other *winde-Inſtruments*, they require a forcible Breath; As *Trumpets*, *Cornets*, *Hunters-hornes*, &c. Which appeareth by the blowne-cheeks of him that windeth them. *Organs* alſo are blowne with a ſtrong winde, by the Bellowes. And note againe, that ſome kinde of *winde-Inſtruments*, are blowne at a ſmall Hole in the ſide, which ſtraitneth the Breath at the firſt Entrance; The rather, in reſpect of their *Traverſe*, and *Stop* above the Hole, which performeth the *Fipples* Part; As it is ſeene in *Flutes*, and *Fifes*, which will not give *Sound*, by a Blaſt at the end, as *Recorders*, &c. doe. Likewiſe in all *Whiſtling*, you contract the Mouth; And to make it more ſharp, Men ſometimes uſe their Finger. But in *Open Aire*, if you throw a Stone, or a Dart, they give no *Sound*: No more doe *Bullets*, except they happen to be a little hollowed in the Caſting; Which Hollowneſſe penneth the *Aire*: Nor yet *Arrowes*, except they bee ruffled in their Feathers, which likewiſe penneth the *Aire*. As for *Small whiſtles*, or *Shepheards Oaten Pipes*; they give a *Sound*, becauſe of their extreme Slenderneſſe, whereby the *Aire* is more pent, than in a Wider *Pipe*. Againe, the *Voices* of *Men*, and Living Creatures, paſſe through the throat, which penneth the Breath. As for the *Iewes Harp*, it is a ſharp Percuſſion; And beſides, hath the vantage of penning the *Aire* in the Mouth.

117 *Solide Bodies*, if they be *very ſoftly percuſſed*, give no *Sound*; As when a man treadeth very ſoftly upon *Boards*. So *Cheſts* or *Doores* in faire weather, when they open eaſily, give no *Sound*. And *Cart-wheeles* ſqueak not when they are liquoured.

118 The *Flame of Tapers*, or *Candles*, though it bee a ſwift Motion, and breaketh the *Aire*, yet paſſeth without *Sound*. *Aire in Ovens*, though (no doubt) it doth (as it were) boyle, and dilate it ſelfe, and is repercuſſed; yet it is without *Noiſe*.

119 *Flame percuſſed by Aire*, giveth a *Noiſe*; As in Blowing of the Fire by Bellowes; Greater, than if the Bellowes ſhould blow upon the *Aire* it ſelfe. And ſo likewiſe *Flame percuſſing the Aire ſtrongly*, (as when Flame ſuddenly taketh and openeth,) giveth a *Noiſe*; So, Great *Flames*, whiles the one impelleth the other, give a bellowing *Sound*.

120 There is a Conceit runneth abroad, that there ſhould bee a *white Powder*, which will diſcharge a Peece without *Noiſe*; which is a dangerous Experiment, if it ſhould be true: For it may cauſe ſecret Murthers. But it ſeemeth to me unpoſſible; For, if the *Aire pent*, bee driven forth, and ſtrike the *Aire open*, it will certainly make a *Noiſe*. As for the *white Powder* (if any ſuch thing bee, that may extinguiſh, or dead the *Noiſe*,)

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it is like to be a Mixture of *Petre*, and *Sulphur*, without *Coale*. For *Petre* alone will not take Fire. And if any Man thinke, that the *Sound* may be extinguished, or deaded, by discharging the *Pent Aire*, before it commeth to the *Mouth* of the *Peece*, and to the *Open Aire*; That is not probable; For it will make more divided *Sounds*: As if you should make a Crosse Barrell hollow, thorow the Barrell of a Peece, it may be, it would give severall Sounds, both at the Nose, and at the Sides. But I conceive, that if it were possible, to bring to passe, that there should be no *Aire* pent at the Mouth of the Peece, the Bullet might fly with small, or no *Noise*. For first it is certaine, there is no *Noise* in the Percussion of the *Flame* upon the *Bullet*. Next the *Bullet*, in piercing thorow the *Aire*, maketh no *Noise*; As hath beene said. And then, if there be no *Pent Aire*, that striketh upon *Open Aire*, there is no Cause of *Noise*; And yet the Flying of the *Bullet* will not be stayed. For that *Motion* (as hath beene oft said) is in the Parts of the *Bullet*, and not in the *Aire*. So as tryall must be made by taking some small *Concave* of *Metall*, no more than you mean to fill with Powder; And laying the Bullet in the Mouth of it, halfe out into the *Open Aire*.

121 I heard it affirmed by a Man, that was a great Dealer in Secrets, but he was but vaine; That there was a *Conspiracy* (which himselfe hindred,) to have killed *Queene Mary*, Sister to *Queene Elizabeth*, by a *Burning-Glasse*; when shee walked in *Saint Iames* Parke, from the Leads of the House. But thus much (no doubt) is true; That if *Burning Glasses* could be brought to a great strength, (as they talke generally of *Burning-Glasses*, that are able to burne a *Navy*,) the *Percussion* of the *Aire* alone, by such a *Burning Glasse*, would make no *Noise*; No more than is found in *Coruscations*, and *Lightnings*, without *Thunders*.

122 I suppose, that *Impression* of the *Aire* with *Sounds*, asketh a time to be conveighed to the *Sense*; As well as the *Impression* of *Species visible*. Or else they will not be heard. And therefore, as the Bullet *moveth* so *swift*, that it is *Invisible*; So the same *Swiftnesse* of *Motion* maketh it *Inaudible*: For we see, that the Apprehension of the *Eye*, is quicker than that of the *Eare*.

123 All *Eruptions* of *Aire*, though small and slight, give an *Entitie of Sound*; which we call *Crackling*, *Puffing*, *Spitting*, &c. As in *Bay-salt*, and *Bay-leaves*, cast into the Fire; So in *Chesnuts*, when they leape forth of the Ashes; So in *Greene Wood* laid upon the Fire, especially *Roots*; So in *Candles* that spit Flame, if they be wet; So in *Risping*, *Sneezing*, &c. So in a *Rose-leafe* gathered together into the fashion of a Purse, and broken upon the Fore-head, or Backe of the Hand, as Children use.

Experiments in Cósort touching *Production*, *Conservation*, & *Delation of Sounds*; And

THe *Cause* given of *Sound*, that it should be an *Elision* of the *Aire* (whereby, if they meane any thing, they meane a *Cutting*, or *Dividing*, or else an *Attenuating* of the *Aire*) is but a Terme of Ignorance. And the Motion is but a Catch of the Wit upon a few Instances; As the Manner is in the *Philosophy* Received. And it is common with Men, that if

The Office of the *Aire* therein.

124 they have gotten a Pretty *Expreſſion*, by a *Word* of *Art*, that *Expreſſion* goeth currant; though it be empty of *Matter*. This Conceit of *Eliſion*, appeareth moſt manifeſtly to be falſe, in that the *Sound* of a *Bell*, *String*, or the like, continueth melting, ſometime, after the *Percuſſion*; But ceaſeth ſtraight-wayes, if the *Bell*, or *String*, be touched and ſtayed: whereas, if it were the *Eliſion* of the *Aire*, that made the *Sound*, it could not be, that the Touch of the *Bell*, or *String*, ſhould extinguiſh ſo ſuddenly that Motion, cauſed by the *Eliſion* of the *Aire*. This appeareth yet more manifeſtly, by *Chiming* with a Hammer, upon the Out-ſide of a *Bell*; For the *Sound* will be according to the inward Concave of the *Bell*; whereas the *Eliſion*, or *Attenuation* of the *Aire*, cannot be but onely betweene the *Hammer*, and the Out-ſide of the *Bell*. So againe, if it were an *Eliſion*, a broad *Hammer*, and a *Bodkin*, ſtrucke upon Metall, would give a divers *Tone*; As well as a divers *Loudneſſe*: But they doe not ſo; For though the *Sound* of the one be *Louder*, and of the other *Softer*, yet the *Tone* is the ſame. Beſides, in *Eccho's* (whereof ſome are as loud as the *Originall Voice*,) there is no new *Eliſion*; but a *Repercuſſion* onely. But that which convinceth it moſt of all, is; that *Sounds* are generated, where there is no *Aire* at all. But theſe and the like Conceits, when Men have cleared their underſtanding, by the light of Experience, will ſcatter, and breake up like a Miſt.

125 It is certaine, that *Sound* is not produced at the firſt, but with ſome *Locall Motion* of the *Aire*, or *Flame*, or ſome other *Medium*; Nor yet without ſome *Reſiſtance*, either in the *Aire*, or the *Body Percuſſed*. For if there be a meere Yeelding, or Ceſſion, it produceth no *Sound*; As hath beene ſaid. And therein *Sounds* differ from *Light*, and *Colours*; which paſſe thorow the *Aire*, or other *Bodies*, without any *Locall Motion* of the *Aire*; either at the firſt, or after. But you muſt attentively diſtinguiſh, betweene the *Locall Motion* of the *Aire*, (which is but *Vehiculum Cauſſæ*, *A Carrier of the Sounds*,) and the *Sounds* themſelves, Conveighed in the *Aire*. For as to the former, we ſee manifeſtly, that no *Sound* is produced (no not by *Aire* it ſelfe againſt other *Aire*, as in *Organs*, &c.) but with a perceptible *Blaſt* of the *Aire*; And with ſome *Reſiſtance* of the *Aire* ſtrucken. For even all *Speech*, (which is one of the gentleſt *Motions* of *Aire*,) is with *Expulſion* of a little *Breath*. And all *Pipes* have a Blaſt, as well as a *Sound*. We ſee alſo manifeſtly, that *Sounds* are carried with *Wind*: And therefore *Sounds* will be heard further with the *Wind*, than againſt the *Wind*; And likewiſe doe riſe and fall with the Intenſion or Remiſſion of the *Wind*. But for the *Impreſſion* of the *Sound*, it is quite another Thing; And is utterly without any *Locall Motion* of the *Aire*, Perceptible; And in that reſembleth the *Species viſible*: For after a *Man* hath lured, or a *Bell* is rung, wee cannot diſcerne any *Perceptible Motion* (at all) in the *Aire*, a long as the *Sound* goeth; but onely at the firſt. Neither doth the *Wind* (as far as it carrieth a *Voice*,) with the *Motion* thereof, confound any of the Delicate, and Articulate Figurations of the *Aire*, in Varietie of Words. And if a *Man* ſpeake a good loudneſſe, againſt

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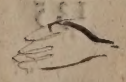
the *Flame* of a *Candle*, it will not make it tremble much; though moſt, when thoſe *Letters* are pronounced, which contract the Mouth; As *F*, *S*, *V*, and ſome others. But *Gentle Breathing*, or *Blowing* without *ſpeaking*, will move the *Candle* far more. And it is the more probable, that *Sound* is without any *Locall Motion* of the *Aire*, becauſe as it differeth from the *Sight*, in that it needeth a *Locall Motion* of the *Aire* at firſt; So it paralleleth in ſo many other things with the *Sight*, and *Radiation* of *Things viſible*; Which (without all queſtion) induce no *Locall Motion* in the *Aire*, as hath beene ſaid.

Nevertheleſſe it is true, that upon the *Noiſe* of *Thunder*, and great *Ordnance*; Glaſſe windowes will ſhake; and Fiſhes are thought to be frayed with the Motion, cauſed by *Noiſe* upon the water. But theſe Effects are from the Locall Motion of the *Aire*, which is a Concomitant of the *Sound*, (as hath beene ſaid;) and not from the *Sound*. 12

It hath beene anciently reported, and is ſtill received, that *Extreme Applauſes*, and *Shouting of People* aſſembled in great Multitudes, have ſo rarified, and broken the Aire, that *Birds* flying over, have fallen downe, the Aire being not able to ſupport them. And it is beleeved by ſome, that *Great Ringing of Bells* in populous Cities, hath chaſed away *Thunder:* and alſo diſſipated Peſtilent Aire: All which may be alſo from the Concuſſion of the Aire, and not from the *Sound*. 127

A very great *Sound*, neare hand, hath ſtrucken many *Deafe*; And at the Inſtant they have found, as it were, the breaking of a Skin or Parchment in their Eare: And my Selfe ſtanding neare one that *Lured* loud, and ſhrill, had ſuddenly an Offence, as if ſomewhat had broken, or beene diſlocated in my *Eare*; And immediately after, a *loud Ringing*; (Not an ordinary Singing, or Hiſſing, but far louder, and differing;) ſo as I feared ſome *Deafeneſſe*. But after ſome halfe Quarter of an Houre it vaniſhed. This Effect may be truly referred unto the *Sound:* For (as is commonly received) an *over-potent Object* doth deſtroy the *Senſe*; And *Spirituall Species*, (both *Viſible*, and *Audible*,) will worke upon the Senſories, though they move not any other Body. 128

In *Delation of Sounds*, the *Encloſure* of them preſerveth them, and cauſeth them to be heard further. And wee finde in Roules of Parchment, or Truncks, the Mouth being laid to the one end of the Rowle of Parchment, or Truncke, and the *Eare* to the other, the *Sound* is heard much further, than in the *Open Aire*. The *Cauſe* is, for that the *Sound* ſpendeth, and is diſſipated in the *Open Aire*; But in ſuch Concaves it is conſerved, and contracted. So alſo in a Peece of Ordnance, if you ſpeake in the Touch-hole, and another lay his *Eare* to the Mouth of the Peece, the *Sound* paſſeth, and is farre better heard, than in the *Open Aire*. 129



It is further to be conſidered, how it proveth and worketh, when the *Sound* is not encloſed all the Length of his Way, but paſſeth partly through open Aire; As where you *ſpeake* ſome diſtance from a *Truncke*; or where the *Eare* is ſome diſtance from the *Truncke*, at the other End; Or where both *Mouth* and *Eare* are diſtant from the *Truncke*. And 130

it is tried, that in a long *Truncke*, of some eight or ten foot, the *Sound* is holpen, though both the *Mouth*, and the *Eare* be a handfull, or more, from the Ends of the *Truncke*; And somewhat more holpen, when the *Eare* of the *Hearer* is neare, than when the *Mouth* of the *Speaker*. And it is certaine, that the *Voice* is better heard in a *Chamber* from *abroad*, than *abroad* from within the *Chamber*.

131 As the *Encloſure*, that is *Round about and Entire*, preſerveth the *Sound*; So doth a *Semi-Concave*, though in a leſſe degree. And therefore, if you divide a *Truncke*, or a *Cane* into two, and one ſpeake at the one end, and you lay your Eare at the other, it will carry the *Voice* further, than in the *Aire* at large. Nay further, if it be not a full *Semi-Concave*; but if you doe the like upon the *Maſt* of a *Ship*, or a *long Pole*, or a *Peece of Ordnance* (though one ſpeake upon the Surface of the *Ordnance*, and not at any of the Bores;) the *Voice* will be heard further, than in the Aire at large.

132 It would be tried, how, and with what proportion of diſadvantage, the *Voice* will be carried in an *Horne*, which is a line Arched; Or in a *Trumpet*, which is a line Retorted; Or in ſome *Pipe* that were Sinuous.

133 It is certaine, (howſoever it croſſe the Received Opinion) that *Sounds* may be created without *Aire*, though *Aire* be the moſt favourable *Deferent* of *Sounds*. Take a *Veſſell* of *Water*, and knap a paire of Tongs ſome depth within the Water, and you ſhall heare the *Sound* of the Tongs well, and not much diminiſhed; And yet there is no *Aire* at all preſent.

134 Take one *Veſſell* of *Silver*, and another of *Wood*, and fill each of them full of Water, and then knap the Tongs together, as before, about an handfull from the Bottome, and you ſhall finde the *Sound* much more Reſounding from the *Veſſell* of *Silver*, than from that of *Wood*: And yet if there be no water in the *Veſſell*, ſo that you knap the Tongs in the *Aire*, you ſhall finde no difference, betweene the *Silver* and *Woodden Veſſell*. Whereby, beſide the maine point of creating *Sound* without *Aire*, you may collect two Things: The one, that the *Sound* communicateth with the Bottome of the *Veſſell*: The other, that ſuch a Communication paſſeth farre better, thorow *Water*, than *Aire*.

135 Strike any *Hard Bodies* together, in the Middeſt of a *Flame*, and you ſhall heare the *Sound*, with little difference, from the *Sound* in the *Aire*.

136 The *Pneumaticall Part*, which is in all *Tangible Bodies*, and hath ſome Affinitie with the *Aire*, performeth, in ſome degree, the Parts of the *Aire*; As when you knocke upon an *Emptie Barrell*, the *Sound* is (in part) created by the Aire on the Out-ſide; And (in part) by the *Aire* in the Inſide; For the *Sound* will be greater or leſſer, as the Barrell is more Emptie, or more full; But yet the *Sound* participateth alſo with the *Spirit* in the *Wood*, thorow which it paſſeth, from the Outſide to the Inſide: And ſo it commeth to paſſe, in the *Chiming* of *Bells*, on the Outſide; where alſo the *Sound* paſſeth to the Inſide: And a number of o-

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ther like Instances, whereof we shall speake more, when we handle the *Communication* of *Sounds*.

It were extreame Grosseneſſe to thinke, (as wee have partly touched before,) that the *Sound* in *Strings* is made, or produced, betweene the *Hand* and the *String*, or the *Quill* and the *String*, or the *Bow* and the *String*: For those are but *Vehicula Motus*, *Passages* to the *Creation* of the *Sound*; the *Sound* being produced betweene the *String* and the *Aire*; And that not by any *Impulsion* of the *Aire* from the first *Motion* of the *String*; but by the *Returne* or *Result* of the *String*, which was strained by the Touch, to his former Place: which *Motion* of *Result* is quicke and sharpe; Whereas the first Motion, is soft and dull. So the *Bow* tortureth the *String* continually, and thereby holdeth it in a Continuall *Trepidation*. 137

Experiments in Consort touching the *Magnitude*, and *Exilitie*, and *Damps* of *Sounds*.

TAke a *Truncke*, and let one whistle at the one End, and hold your Eare at the other, and you shall finde the *Sound* strike so sharpe, as you can scarce endure it. The *Cause* is, for that *Sound* diffuseth it selfe in round; And so spendeth it Selfe; But if the *Sound*, which would scatter in *Open Aire*, be made to goe all into a Canale; It must needs give greater force to the *Sound*. And so you may note, that *Enclosures* doe not onely preserve *Sound*, but also Encrease and Sharpen it. 138

A *Hunters Horne*, being greater at one end, than at the other, doth encrease the *Sound* more, than if the *Horne* were all of an equall Bore. The *Cause* is, for that the *Aire*, and *Sound*, being first contracted at the lesser End, and afterwards having more Roome to spread at the greater End; doe dilate themselves; And in Comming out strike more *Aire*; whereby the *Sound* is the Greater, and Baser. And even *Hunters Hornes*, which are sometimes made straight, and not Oblique, are ever greater at the lower end. It would be tried also in *Pipes*, being made *far larger* at the lower end: Or being made with a *Belly* towards the lower End; And then issuing into a straight Concave againe. 139

There is in *Saint Iames Fields*, a *Conduit* of *Bricke*, unto which joyneth a *low Vault*; And at the End of that, a *Round House* of Stone: And in the *Bricke Conduit* there is a Window; And in the *Round House* a Slit or Rift of some little breadth: If you cry out in the Rift, it will make a fearfull Roaring at the Window. The *Cause* is the same with the former; For that all *Concaves*, that proceed from more Narrow to more Broad, doe amplifie the *Sound* at the Comming out. 140

Hawkes Bells, that have Holes in the Sides, give a greater Ring, than if the Pellet did strike upon Brasse, in the *Open Aire*. The Cause is the same with the first *Instance* of the *Truncke*; Namely, for that the *Sound* Enclosed with the Sides of the *Bell*, commeth forth at the *Holes* unspent, and more strong. 141

In *Drums*, the Closeneſſe round about, that preserveth the *Sound* from dispersing, maketh the *Noise* come forth at the *Drum-Hole*, farre more loud, and strong, than if you should strike upon the like *Skin*, extended 142

tended in the Open Aire. The *Cauſe* is the ſame with the two precedent.

143 *Sounds* are better heard, and further off, in an *Evening*, or in the *Night*, than at the *Noone*, or in the *Day*. The *Cauſe* is, for that in the *Day*, when the *Aire* is more Thin, (no doubt) the *Sound* pierceth better; But when the *Aire* is more Thicke, (as in the *Night*) the *Sound* ſpendeth and ſpreadeth abroad leſſe: And ſo it is a Degree of *Encloſure*. As for the *Night*, it is true alſo, that the Generall Silence helpeth.

144 There be two Kinds of *Reflexions* of *Sounds*; The one at *Diſtance*, which is the *Eccho*; Wherein the *Originall* is heard diſtinctly, and the *Reflexion* alſo diſtinctly; Of which we ſhall ſpeake hereafter: The other in *Concurrence*; When the *Sound* Reflecting (the *Reflexion* being neare at hand) returneth immediatly upon the *Originall*, and ſo iterateth it not, but amplifieth it. Therefore we ſee, that *Muſicke* upon the water ſoundeth more; And ſo likewiſe *Muſicke* is better in Chambers Wainſcotted, than Hanged.

145 The *Strings* of a Lute, or Violl, or Virginalls, doe give a far greater *Sound*, by reaſon of the *Knot*, and *Board*, and *Concave* underneath, than if there were nothing but onely the *Flat* of a *Board*, without that *Hollow* and *Knot*, to let in the Upper Aire into the Lower. The *Cauſe* is, the Communication of the Upper Aire with the Lower; And Penning of both from Expence, or Diſperſing.

146 An *Iriſh Harpe* hath Open Aire on both ſides of the *Strings*: And it hath the *Concave* or *Belly*, not along the *Strings*, but at the End of the *Strings*. It maketh a more Reſounding *Sound*, than a *Bandora*, *Orpharion*, or *Citterne*, which have likewiſe *Wire-ſtrings*. I judge the *Cauſe* to be, for that Open Aire on both Sides helpeth, ſo that there be a *Concave*; Which is therefore beſt placed at the End.

147 In a *Virginall*, when the *Lid* is downe, it maketh a more exile *Sound*, than when the *Lid* is open. The *Cauſe* is, for that all *Shutting in* of *Aire*, where there is no competent Vent, dampeth the *Sound*: Which maintaineth likewiſe the former *Inſtance*; For the *Belly* of the *Lute*, or *Violl*, doth pen the *Aire* ſomewhat.

148 There is a *Church* at *Gloceſter*, (and as I have heard the like is in ſome other places;) where if you ſpeake againſt a Wall, ſoftly, another ſhall heare your *Voice* better a good way off, than neare hand. Enquire more particularly of the Frame of that Place. I ſuppoſe there is ſome Vault, or Hollow, or Iſle, behinde the Wall, and ſome Paſſage to it towards the further end of that Wall, againſt which you ſpeake; So as the *Voice*, of him that ſpeaketh, ſlideth along the Wall, and then entreth at ſome Paſſage, and communicateth with the *Aire* of the Hollow; For it is preſerved ſomewhat by the plaine wall; but that is too weake to give a *Sound* Audible, till it hath communicated with the backe *Aire*.

149 Strike upon a *Bow-ſtring*, and lay the *Horne* of the *Bow* neare your Eare, and it will encreaſe the *Sound*, and make a degree of a *Tone*. The *Cauſe* is, for that the Senſory, by reaſon of the Cloſe Holding, is percuſſed,

cussed, before the Aire disperseth. The like is, if you hold the *Horne* betwixt your Teeth. But that is a plaine *Delation* of the *Sound*; from the Teeth, to the Instrument of Hearing; For there is a great Entercourse between those two Parts; As appeareth by this; That a Harsh *Grating Tune* setteth the Teeth on edge. The like falleth out, if the *Horne* of the *Bow* be put upon the Temples; But that is but the Slide of the *Sound* from thence to the Eare.

If you take a *Rod* of *Iron*, or *Brasse*, and hold the one end to your Eare, 150
and strike upon the other, it maketh a far greater *Sound*, than the like Stroke upon the *Rod*, not so made Contiguous to the Eare. By which, and by some other *Instances*, that have beene partly touched, it should appeare; That *Sounds* doe not onely slide upon the Surface of a Smooth Body, but doe also communicate with the Spirits, that are in the Pores of the Body.

I remember in *Trinitie Colledge* in *Cambridge*, there was an *Vpper* 151
Chamber, which being thought weake in the Roofe of it, was supported by a Pillar of Iron, of the bignesse of ones Arme, in the middest of the *Chamber*; Which if you had strucke, it would make a little flat Noise in the *Roome* where it was strucke; But it would make a great Bombe in the *Chamber* beneath.

The *Sound* which is made by *Buckets* in a *well*, when they touch up- 152
on the *water*; Or when they strike upon the side of the *well*; Or when two Buckets dash the one against the other; These *Sounds* are deeper, and fuller, than if the like Percussion were made in the *Open Aire*. The *Cause* is, the Penning and Enclosure of the Aire, in the Concave of the *well*.

Barrells placed in a Roome under the Floare of a *Chamber*, make all 153
Noises in the same Chamber, more Full and Resounding.

So that there be fiue wayes (*in generall*,) of Majoration of Sounds: Enclosure Simple; Enclosure with Dilatation; Communication; Reflexion Concurrent; *and* Approach *to the* Sensory.

For *Exilitie* of the *Voice*, or other *Sounds*: It is certaine, that the 154
Voice doth passe thorow *Solide* and *Hard Bodies*, if they be not too thick. And thorow *Water*; which is likewise a very Close Body, and such an one, as letteth not in Aire. But then the *Voice*, or other *Sound*, is reduced, by such passage, to a great *Weaknesse*, or *Exilitie*. If therefore you stop the *Holes* of a *Hawkes Bell*, it will make no Ring, but a flat Noise, or Rattle. And so doth the *Aetites*, or *Eagles* Stone, which hath a little Stone within it.

And as for *Water*, it is a certaine Triall: Let a Man goe into a *Bath*, 155
and take a *Paile*, and turne the Bottome upward, and carry the Mouth of it, (Even,) downe to the Levell of the *Water*; and so presse it downe under the *Water*, some handfull and an halfe, still keeping it even, that it may not tilt on either side, and so the Aire get out: Then let him that is in the *Bath*, dive with his Head so far under *water*, as he may put his Head into the *Paile*; and there will come as much *Aire* bubling forth, as will make

make Roome for his Head. Then let him ſpeake; and any that ſhall ſtand without, ſhall heare his *Voice* plainly; but yet made extreme ſharpe and exile, like the *Voice* of *Puppets:* But yet the *Articulate Sounds* of the *Words* will not be confounded. Note that it may be much more handſomely done, if the *Paile* be put over the Mans head above Water, and then he cowre downe, and the *Paile* be preſſed downe with him. Note that a Man muſt kneele or ſit, that he may be lower than the *Water*. A Man would thinke, that the *Sicilian Poet* had knowledge of this *Experiment*; For he ſaith; That *Hercules Page Hylas* went with a Water-pot, to fill it at a pleaſant *Fountaine*, that was neere the Shore, and that the *Nymphs* of the *Fountaine* fell in love with the Boy, and pulled him vnder *Water*, keeping him alive; And that *Hercules* miſſing his *Page*, called him by his Name, aloud, that all the Shore rang of it; And that *Hylas* from within the Water, anſwered his Maſter; But (that which is to the preſent purpoſe) with ſo ſmall and exile a *Voice*, as *Hercules* thought he had beene three miles off, when the *Fountaine* (indeed) was faſt by.

156 In *Lutes*, and *Inſtruments* of *Strings*, if you ſtop a *String* high, (whereby it hath leſſe Scope to tremble) the *Sound* is more *Treble*, but yet more dead.

157 Take two *Sawcers*, and ſtrike the Edge of the one againſt the Bottome of the other, within a *Paile* of *Water*; And you ſhall finde, that as you put the Sawcers lower, and lower, the Sound groweth more flat; even while Part of the *Sawcer* is above the Water; But that Flatneſſe of *Sound* is joyned with a Harſhneſſe of *Sound*; which (no doubt) is cauſed by the Inequalitie of the *Sound*, which commeth from the Part of the *Sawcer* under the *Water*, and from the Part above. But when the *Sawcer* is wholly under the *Water*, the *Sound* becommeth more cleare, but farre more low; And as if the *Sound* came from a farre off.

158 A *Soft Body* dampeth the *Sound*, much more than a *Hard:* As if a Bell hath Cloth, or Silke wrapped about it, it deadeth the *Sound* more, than if it were Wood. And therefore in *Clericalls*, the Keyes are lined; And in Colledges they uſe to line the Tablemen.

159 Triall was made in a *Recorder*, after theſe ſeverall manners. The Bottome of it was ſet againſt the Palme of the Hand; ſtopped with Wax round about; ſet againſt a Damaske Cuſhion; Thruſt into Sand; Into Aſhes; Into Water, (halfe an Inch under the Water;) Cloſe to the Bottome of a Silver Baſin; And ſtill the *Tone* remained: But the Bottome of it was ſet againſt a Woollen Carpet; A Lining of Pluſh; A Locke of Wooll, (though looſely put in;) Againſt Snow; And the Sound of it was quite deaded, and but Breath.

160 *Iron* Hot produceth not ſo full a *Sound*, as when it is Cold; For while it is hot, it appeareth to be more Soft, and leſſe Reſounding. So likewiſe *Warme Water*, when it falleth, maketh not ſo full a *Sound*, as *Cold:* And I conceive it is ſofter, and neerer the Nature of Oyle; For it is more ſlippery; As may be perceived, in that it ſcowreth better.

161 Let there be a *Recorder* made, with two Fipples, at each end one; The

Truncke

Truncke of it of the length of two *Recorders*, and the Holes answerable towards each end; And let two play the same Lesson upon it, at an Unison; And let it be noted, whether the *Sound* be confounded; or amplified; or dulled. So likewise let a *Crosse* be made, of two Trunckes (thorow-out) hollow; And let two speake, or sing, the one long-wayes, the other traverse: And let two heare at the opposite Ends; And note, whether the *Sound* be confounded; amplified; or dulled. Which two *Instances* will also give light to the *Mixture* of *Sounds*; whereof we shall speake hereafter.

A *Bellowes* blowne in at the *Hole* of a *Drum*, and the *Drum* then strucken, maketh the *Sound* a little flatter, but no other apparent Alteration. The *Cause* is manifest; Partly for that it hindreth the Issue of the *Sound*; And partly for that it maketh the Aire, being blowne together, lesse moveable. 162

THe *Loudnesse*, and *Softnesse* of *Sounds*, is a Thing distinct from the *Magnitude* and *Exilitie* of *Sounds*; For a *Base String*, though softly strucken, giveth the greater *Sound*; But a *Treble String*, if hard strucken, will be heard much further off. And the *Cause* is, for that the *Base String* striketh more Aire; And the *Treble* lesse Aire, but with a sharper Percussion. Experiments in Consort touching the *Loudnesse* or *Softnesse* of *Sounds*; and their *Carriage at longer or shorter Distance.*

It is therefore the *Strength* of the *Percussion*, that is a Principall *Cause* of the *Loudnesse* or *Softnesse* of *Sounds*: As in knocking harder or softer; Winding of a Horne stronger or weaker; Ringing of a Hand-bell harder or softer &c. And the *Strength* of this *Percussion*, consisteth, as much, or more, in the *Hardnesse* of the *Body Percussed*, as in the *Force* of the *Body Percussing*: For if you strike against a Cloth, it will give a lesse *Sound*; If against Wood, a greater; If against Metall, yet a greater; And in Metals, if you strike against Gold, (which is the more pliant,) it giveth the flatter *Sound*; If against Silver, or Brasse, the more Ringing *Sound*. As for *Aire*, where it is strongly pent, it matcheth a *Hard Body*. And therefore we see in discharging of a *Peece*, what a great Noise it maketh. We see also, that the Charge with Bullet; Or with Paper wet, and hard stopped; Or with Powder alone, rammed in hard; maketh no great difference in the *Loudnesse* of the Report. 163 164

The *Sharpnesse* or *Quickenesse* of the *Percussion*, is a great *Cause* of the *Loudnesse*, as well as the *Strength*: As in a Whip, or Wand, if you strike the Aire with it; the Sharper & Quicker you strike it, the *Louder Sound* it giveth. And in playing upon the *Lute*, or *Virginalls*, the quicke Stroke or Touch, is a great life to the *Sound*. The *Cause* is, for that the Quicke Striking cutteth the Aire speedily; whereas the Soft Striking, doth rather beat, than cut. 165

The *Communication* of *Sounds* (as in Bellies of *Lutes*, Empty Vessells, &c.) hath been touched obiter, in the *Majoration* of *Sounds*: But it is fit also to make a *Title* of it apart. Experiments in Consort touching the *Communication* of *Sounds*.

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166 The *Experiment* for greateſt Demonſtration of *Communication* of *Sounds*, is the *Chiming* of *Bells*; where if you ſtrike with a Hammer upon the Vpper Part, and then upon the Midſt, and then upon the Lower, you ſhall finde the *Sound* to be more Treble, and more Baſe, according unto the Concave, on the Inſide; though the Percuſſion be onely on the Outſide.

167 When the *Sound* is created betweene the *Blaſt* of the *Mouth*, and the *Aire* of the *Pipe*, it hath nevertheleſſe ſome *Communication* with the Matter of the Sides of the *Pipe*, and the *Spirits* in them contained; for in a *Pipe*, or *Trumpet*, of Wood, and Braſſe, the *Sound* will be divers; So if the *Pipe* be covered with *Cloth*, or *Silke*, it will give a divers *Sound*, from that it would doe of it ſelfe; So, if the *Pipe* be a *little wet* on the *Inſide*, it will make a differing *Sound*, from the ſame *Pipe dry*.

168 That *Sound* made within *Water*, doth communicate better with a hard Body thorow *Water*, than made in *Aire*, it doth with *Aire*; *Vide Experimentum*, 134.

Experiments in Cõſort touching *Equality*, and *Inequalitie* of *Sounds*.

We have ſpoken before (in the *Inquiſition* touching *Muſicke*,) of *Muſicall Sounds*, whereunto there may be a Concord or Diſcord in two Parts; Which *Sounds* we call *Tones*; And likewiſe of *Immuſicall Sounds*; And have given the *Cauſe*, that the *Tone* proceedeth of *Equalitie*, and the other of *Inequalitie*. And we have alſo expreſſed there, what are the *Equall Bodies* that give *Tones*, and what are the *Vnequall* that give none. But how we ſhall ſpeake of ſuch *Inequalitie* of *Sounds*, as proceedeth, not from the Nature of the Bodies themſelves, but is Accidentall; Either from the *Roughneſſe*, or *Obliquitie* of the *Paſſage*; or from the *Doubling* of the *Percutient*; Or from the *Trepidation* of the *Motion*.

169 A *Bell*, if it have a *Rift* in it, whereby the *Sound* hath not a cleare Paſſage, giveth a *Hoarſe* and *Iarring Sound*; So the *Voice* of *Man*, when by Cold taken the Weſill groweth rugged, and (as wee call it) furred, becommeth hoarſe. And in theſe two *Inſtances*, the *Sounds* are Ingrate; becauſe they are meerely *Vnequall*: But, if they be *Vnequall* in *Equalitie*, then the *Sound* is Gratefull, but Purling.

170 All *Inſtruments*, that have either *Returnes*, as Trumpets; Or *Flexions*, as Cornets; Or are *Drawne up*, and *put from*, as Sackbuts; have a *Purling Sound*: But the *Recorder*, or *Flute*, that have none of theſe *Inequalities*, give a cleare *Sound*. Nevertheleſſe, the *Recorder* it ſelfe, or *Pipe* moiſtened a little in the Inſide, ſoundeth more ſolemnly, and with a little Purling, or Hiſſing. Againe, a *Wreathed String*, ſuch as are in the Baſe Strings of *Bandoraes*, giveth alſo a *Purling Sound*.

171 But a *Lute-ſtring*, if it be meerely *Vnequall* in his Parts, giveth a Harſh and

and Untuneable *Sounds*; which *Strings* we call *False*, being bigger in one Place than in another; And therefore *Wire-strings* are never *False*. Wee see also, that when we try a *False Lute-string*, wee use to extend it hard betweene the fingers, and to fillip it; And if it giveth a double *Species*, it is *True*; But if it giveth a treble, or more, it is *False*.

172 *Waters*, in the *Noise* they make as they runne, represent to the Eare a *Trembling Noise*; And in *Regalls*, (where they have a *Pipe*, they call the *Nightingale-Pipe*, which containeth *Water*) the *Sound* hath a continuall Trembling: And Children have also little Things they call *Cockes*, which have *Water* in them; And when they blow, or whistle in them, they yeeld a *Trembling Noise*; Which *Trembling* of *Water*, hath an affinitie with the Letter *L*. All which *Inequalities* of *Trepidation*, are rather pleasant, than otherwise.

173 All *Base Notes*, or very *Treble Notes*, give an Asper *Sound*; For that the *Base* striketh more Aire, than it can well strike equally: And the *Treble* cutteth the Aire so sharpe, as it returneth too swift, to make the *Sound* Equall: And therefore a *Meane*, or *Tenor*, is the sweetest Part.

174 We know Nothing, that can at pleasure make a *Musicall*, or *Immusicall Sound*, by voluntary *Motion*, but the *Voice* of *Man*, and *Birds*. The *Cause* is, (no doubt) in the Weasill or Wind-pipe, (which we call *Aspera Arteria*,) which being well extended, gathereth *Equalitie*; As a Bladder that is wrinckled, if it be extended, becommeth smooth. The Extension is alwayes more in *Tones*, than in *Speech*: Therefore the *Inward Voice* or *Whisper* can never give a *Tone*: And in *Singing*, there is (manifestly) a greater Working and Labour of the Throat, than in *Speaking*; As appeareth in the Thrusting out, or Drawing in of the Chinne, when we sing.

175 The *Humming* of *Bees*, is an *Vnequall Buzzing*; And is conceived, by some of the Ancients, not to come forth at their Mouth, but to be an *Inward Sound*; But (it may be) it is neither; But from the motion of their Wings; For it is not heard but when they stirre.

176 All *Metals quenched* in *Water*, give a Sibilation or Hissing Sound; (which hath an Affinitie with the letter Z.) notwithstanding the *Sound* be created betweene the *Water* or *Vapour*, and the *Aire*. *Seething* also, if there be but small Store of *Water*, in a Vessell, giveth a Hissing *Sound*; But *Boyling* in a full Vessell, giveth a Bubling *Sound*, drawing somewhat neare to the *Cocks* used by Children.

177 Triall would be made, whether the *Inequalitie*, or Interchange of the *Medium*, will not produce an *Inequalitie* of *Sound*; As if three *Bells* were made one within another, and Aire betwixt Each; And then the outermost *Bell* were chimed with a Hammer, how the *Sound* would differ from a Simple *Bell*. So likewise take a *Plate* of *Brasse*, and a *Plancke* of *Wood*, and joyne them close together, and knock upon one of them, and see if they doe not give an *unequall Sound*. So make two or three *Partitions* of *Wood* in a *Hogshead*, with *Holes* or *Knots* in them: And marke the difference of their *Sound*, from the *Sound* of an *Hogshead*, without such *Partitions*.

It

Experiments in Consort, touching the *more Treble*, and the *more Base Tones*, or *Musicall Sounds*.

178 IT is evident, that the *Percussion* of the *Greater Quantitie of Aire*, causeth the *Baser Sound*; And the lesse *Quantitie*, the more *Treble Sound*. The *Percussion* of the *Greater Quantitie of Aire*, is produced by the *Greatnesse of the Body Percussing*; By the *Latitude* of the *Concave*, by which the *Sound* passeth; and by the *Longitude* of the same *Concave*. Therefore wee see that a *Base string*, is greater than a *Treable*; A *Base Pipe* hath a greater Bore than a *Treble*; And in *Pipes*, and the like, the lower the Note Holes be, and the further off from the Mouth of the *Pipe*, the more *Base Sound* they yeeld; And the nearer the Mouth, the more *Treble*. Nay more, if you strike an *Entire Body*, as an *Andiron* of *Brasse*, at the Top, it maketh a more *Treble Sound*; And at the Bottome a *Baser*.

179 It is also evident, that the *Sharper* or *Quicker Percussion of Aire* causeth the more *Treble Sound*; And the *Slower* or *Heavier*, the more *Base Sound*. So we see in *Strings*; the more they are wound up, and strained; (And thereby give a more quicke Start-backe;) the more *Treble* is the *Sound*; And the slacker they are, or lesse wound up, the *Baser* is the *Sound*. And therefore a Bigger *String* more strained, and a Lesser *String*, lesse strained, may fall into the same *Tone*.

180 *Children*, *Women*, *Eunuchs* have more small and shrill *Voices*, than *Men*. The Reason is, not for that *Men* have greater Heat, which may make the *Voice* stronger, (for the strength of a *Voice* or *Sound*, doth make a difference in the *Loudnesse* or *Softnesse*, but not in the *Tone*;) But from the Dilatation of the Organ; which (it is true) is likewise caused by Heat. But the Cause of *Changing* the *Voice*, at the yeares of Pubertie, is more obscure. It seemeth to be, for that when much of the Moisture of the Body, which did before irrigate the Parts, is drawne downe to the Spermaticall vessels; it leaveth the Body more hot than it was; whence commeth the Dilatation of the Pipes: For we see plainly, all Effects of Heat, doe then come on; As Pilositie, more Roughnesse of the Skinne, Hardnesse of the Flesh, &c.

181 The Industry of the *Musitian*, hath produced two other Meanes of *Strayning* or *Intension* of *Strings*, besides their *Winding up*. The one is the *Stopping* of the *String* with the *Finger*; As in the Necks of Lutes, Viols, &c. The other is the *Shortnesse* of the *String*; As in Harps, Virginalls, &c. Both these have one, and the same reason; For they cause the *String* to give a quicker Start.

182 In the *Straining* of a *String*, the further it is strained, the lesse *Superstraining* goeth to a *Note*; For it requireth good Winding of a String, before it will make any Note at all: And in the Stops of Lutes, &c. the higher they goe, the lesse Distance is betweene the Frets.

183 If you fill a *Drinking Glasse* with *Water*, (especially one Sharp below, and Wide above,) and fillip upon the Brim, or Outside; And after empty Part of the *Water*, and so more and more, and still try the *Tone* by Fillipping; you shall finde the *Tone* fall, and be more *Base*, as the *Glasse* is more Emptie.

The

Experiments in Consort touching the *Proportion* of *Treble* and *Base Tones.*

The Just and Measured *Proportion* of the *Aire Percussed*, towards the *Basenesse* or *Trebleness* of *Tones*, is one of the greatest Secrets in the Contemplation of *Sounds*. For it discovereth the true *Coincidence* of *Tones* into *Diapasons*; Which is the Returne of the same *Sound*. And so of the *Concords* and *Discords*, betweene the *Vnison*, and *Diapason*; Which we have touched before, in the *Experiments* of *Musicke*; but thinke fit to resume it here, as a principall Part of our Enquiry touching the *Nature* of *Sounds*. It may bee found out in the *Proportion* of the *Winding* of *Strings*; In the *Proportion* of the *Distance* of *Frets*; And in the *Proportion* of the *Concave* of *Pipes*, &c. But most commodiously in the last of these.

Try therefore the *Winding* of a *String* once about, as soone as it is brought to that Extension, as will give a *Tone*; And then of twice about; And thrice about, &c. And marke the Scale or Difference of the Rise of the *Tone*: Whereby you shall discover, in one, two Effects; Both the *Proportion* of the *Sound* towards the *Dimension* of the *winding*; And the *Proportion* likewise of the *Sound* towards the *String*, as it is more or lesse strained. But note that to measure this, the way will bee, to take the Length in a right Line of the *String*, upon any Winding about of the Pegge. 184

As for the *Stops*, you are to take the *Number* of *Frets*; And principally the *Length* of the *Line*, from the first Stope of the *String*, unto such a Stop as shall produce a *Diapason* to the former Stop, upon the same *String*. 185

But it will best (as it is said) appeare, in the *Bores* of *Wind-Instruments*: And therefore cause some halfe dozen *Pipes*, to be made, in length, and all things else, alike, with a single, double, and so on to a sextuple *Bore*; And so marke what Fall of *Tone* every one giveth. But still in these three last *Instances*, you must diligently observe, what *length* of *String*, or *Distance* of *Stop*, or *Concave* of *Aire*, maketh what *Rise* of *Sound*. As in the last of these (which (as we said) is that, which giveth the aptest demonstration,) you must set downe what Encrease of *Concave* goeth to the Making of a *Note* higher; And what of two *Notes*; And what of three *Notes*; And so up to the *Diapason*: For then the great Secret of *Numbers*, and *Proportions*, will appeare. It is not unlike, that those that make *Recorders*, &c. know this already: for that they make them in *Sets*. And likewise *Bell-founders* in fitting the tune of their *Bells*. So that Enquiry may save Triall. Surely, it hath beene observed by one of the *Ancients*, that an *Empty Barrell* knocked upon with the finger, giveth a *Diapason* to the *Sound* of the like *Barrell full*; But how that should be, I doe not well understand; For that the knocking of a *Barrell-full*, or *Empty*, doth scarce give any *Tone*. 186

187 There is required some sensible Difference in the *Proportion* of creating a *Note*, towards the *Sound* it selfe, which is the Passive: And that it bee not too neare, but at a distance. For in a *Recorder*, the three uppermost Holes, yeeld one *Tone*; which is a *Note* lower than the *Tone* of the first three. And the like (no doubt) is required in the Winding or Stopping of *Strings*.

Experiments in Consort touching *Exteriour*, and *Interiour Sounds*.

There is another Difference of *Sounds*, which we will call *Exteriour*, and *Interiour*. It is not *Soft*, nor *Loud*: Nor it is not *Base*, nor *Treble*: Nor it is not *Musicall*, nor *Immusicall*: Though it be true, that there can be no *Tone* in an *Interiour Sound*: But on the other side, in an *Exteriour Sound*, there may bee both *Musicall* and *Immusicall*. We shall therefore enumerate them, rather than precisely distinguish them; Though (to make some Adumbration of that we meane) the *Interiour* is rather an *Impulsion* or *Contusion* of the *Aire*, than an *Elision* or *Section* of the same. So as the *Percussion* of the one, towards the other, differeth, as a *Blow* differeth from a *Cut*.

188 In *Speech* of *Man*, the *Whispering*, (which they call *Susurrus* in *Latine*,) whether it be louder or softer, is an *Interiour Sound*; But the *Speaking out*, is an *Exteriour Sound*; And therefore you can never make a *Tone*, nor sing in *whispering*; But in *Speech* you may: So *Breathing*, or *Blowing* by the *Mouth*, *Bellowes*, or *Wind*, (though loud) is an *Interiour Sound*; But the *Blowing* thorow a *Pipe*, or *Concave*, (though soft) is an *Exteriour*. So likewise, the greatest *Winds*, if they have no Coarctation, or blow not hollow, give an *Interiour Sound*; The Whistling or hollow *Wind* yeeldeth a Singing, or *Exteriour Sound*; The former being pent by some other Body; The latter being pent in by his owne Density: And therefore we see, that when the *Wind* bloweth hollow, it is a Signe of Raine. The *Flame*, as it moveth within it selfe, or is blowne by a *Bellowes*, giveth a Murmur or *Interiour Sound*.

189 There is no *Hard Body*, but strucke against another *Hard Body*, will yeeld an *Exteriour Sound*, greater or lesser: In so much as if the Percussion be over-soft, it may induce a Nullity of *Sound*; But never an *Interiour Sound*; As when one treadeth so softly, that hee is not heard.

190 Where the *Aire* is the *Percutient*, pent, or not pent, against a *Hard Body*, it never giveth an *Exteriour Sound*; As if you blow strongly with a Bellowes against a Wall.

191 *Sounds* (both *Exteriour* and *Interiour*,) may be made, as well by *Suction*, as by *Emission* of the *Breath*: As in *Whistling*, or *Breathing*.

Experiments in Consort, touching *Articulation of Sounds*.

192 IT is evident, and it is one of the strangest Secrets in *Sounds*, that the *whole Sound* is not in the *whole Aire* only; But the *whole Sound* is also in every small *Part* of the *Aire*. So that all the curious Diversity of *Articulate*

culate Sounds, of the Voice of Man, or Birds, will enter at a ſmall Cranny, Inconfuſed.

193 The *Vnequall Agitation* of the *Winds*, and the like, though they bee materiall to the Carriage of the *Sounds*, further, or leſſe way; yet they doe not confound the *Articulation* of them at all, within that diſtance that they can be heard; Though it may be, they make them to be heard leſſe Way, than in a Still; as hath beene partly touched.

194 Over-great Diſtance confoundeth the *Articulation* of *Sounds*; As we ſee, that you may heare the *Sound* of a Preachers voice, or the like, when you cannot diſtinguiſh what he ſaith. And one *Articulate Sound* will confound another; As when many ſpeake at once.

195 In the *Experiment* of *Speaking under Water*, when the Voice is reduced to ſuch an Extreame Exility, yet the *Articulate Sounds*, (which are the *Words*) are not confounded; as hath beene ſaid.

196 I conceive, that an *Extreme Small*, or an *Extreme Great Sound*, cannot be *Articulate*; But that the *Articulation* requireth a *Mediocrity* of *Sound*: For that the *Extreme Small Sound* confoundeth the *Articulation* by *Contracting*; And the *Great Sound*, by *Diſpercing*: And although (as was formerly ſaid) a *Sound Articulate*, already created, will bee contracted into a ſmall Cranny; yet the firſt *Articulation* requireth more Dimenſion.

197 It hath beene obſerved, that in a *Roome*, or in a *Chappell*, Vaulted below, and Vaulted likewiſe in the Rooſe, a Preacher cannot be heard ſo well, as in the like Places not ſo Vaulted. The Cauſe is, for that the *Subſequent Words* come on, before the *Precedent words* vaniſh: And therfore the *Articulate Sounds* are more confuſed, though the Groſſe of the *Sound* be greater.

198 The *Motions* of the *Tongue*, *Lips*, *Throat*, *Pallat*, &c. which goe to the *Making* of the ſeverall *Alphabeticall Letters*, are worthy Enquiry, and pertinent to the preſent *Inquiſition* of *Sounds*: But becauſe they are ſubtill, and long to deſcribe, wee will refer them over, and place them amongſt the *Experiments* of *Speech*. The *Hebrewes* have beene diligent in it, and have aſſigned, which *Letters* are *Labiall*, which *Dentall*, which *Gutturall* &c. As for the *Latines*, and *Grecians*, they have diſtingviſhed betweene *Semi-vowels*, and *Mutes*; And in *Mutes*, betweene *Mutæ Tenues*, *Mediæ*, and *Aſpiratæ*; Not amiſſe; But yet not diligently enough. For the ſpeciall *Stroakes*, & *Motions*, that create thoſe *Sounds*, they have little enquired: As that the *Letters*, *B. P. F. M.* are not expreſſed, but with the *Contracting*, or *Shutting* of the *Mouth*; That the *Letters N.* and *B.* cannot bee pronounced, but that the *Letter N.* will turne into *M.* As *Hecatonba*, will be *Hecatomba*. That *M.* and *T.* cannot be pronounced to gether; but *P.* will come betweene; as *Emtus*, is pronounced *Emptus*; And a Number of the like. So that if you enquire to the full; you will finde, that to the Making of the whole *Alphabet*, there will be fewer *Simple Motions* required, than there are *Letters*.

199 The *Lungs* are the moſt Spongy Part of the Body; And therefore ableſt to contract, and dilate it ſelfe; And where it contracteth it ſelfe,

it expelleth the *Aire*; which thorow the *Artire*, *Throat*, and *Mouth*, maketh the *Voice*: But yet *Articulation* is not made, but with the helpe of the *Tongue*, *Pallate*, and the rest of those they call *Instruments* of *voice*.

200 There is found a Similitude, betweene the *Sound* that is made by *Inanimate Bodies*, or by *Animate Bodies*, that have no *Voice Articulate*; and divers *Letters* of *Articulate Voices*: And commonly Men have given such Names to those *Sounds*, as doe allude unto the Articulate Letters. As *Trembling* of *water* hath Resemblance with the *Letter L*; *Quenching* of *Hot Mettalls*, with the *Letter Z*; *Snarling* of *Dogs*, with the *Letter R*; The *Noise of Scritchowles*, with the *Letter Sh*; *Voice* of *Cats*, with the *Dypthong Eu*; *Voice* of *Cuckoes*, with the *Dypthong Ou*; *Sounds* of *Strings*, with the *Letter Ng*: So that if a Man, (for Curiosity, or Strangenesse sake,) would make a *Puppet* or other Dead Body, to pronounce a *word*; Let him consider, on the one Part, the Motion of the *Instruments* of *Voice*; and on the other part the like *Sounds* made in *Inanimate Bodies*; And what Conformity there is that causeth the Similitude of *Sounds*; And by that he may minister light to that Effect.

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NATV-

NATVRALL HISTORIE.

III. Century.

ALL *Sounds* (whatsoever) move Round; That is to say; On *all Sides*; *Vpwards*; *Downewards*; *Forwards*; and *Backwards*. This appeareth in all *Instances*.

201 Experiments in Consort touching the *Motions* of *Sounds*, in what *Lines* they are *Circular*, *Oblique*, *Straight*; *Vpwards*, *downwards*; *Forwards*, *Backwards*.

Sounds do not require to be conveyed to the *Sense*, in a *Right Line*, as *Visibles* doe, but may bee *Arched*; Though it bee true, they move strongest in a *Right Line*; Which nevertheless is not caused by the *Rightnesse* of the *Line*, but by the Shortnesse of the distance; *Linea recta brevissima*. And therefore wee see, if a *Wall* be betweene, and you speake on the one Side, you heare it on the other; Which is not because the *Sound* Passeth thorow the *Wall*; but *Arcbeth* over the *Wall*.

202

If the *Sound* be *Stopped* and *Repercussed*, it commeth about on the other Side, in an *Oblique Line*. So, if in a *Coach*, one side of the Boot be downe, and the other up; And a Begger beg on the Close Side; you would thinke that hee were on the Open Side. So likewise, if a *Bell* or *Clocke*, bee (for Example) on the North-side of a Chamber; And the Window of that Chamber be upon the South; He that is in the Chamber will thinke the *Sound* came from the South.

203

Sounds, though they *spread round*, (so that there is an *Orbe*, or *Spherical Area* of the *Sound*;) yet they move strongest, and goe furthest in the *Fore-lines*, from the first Locall Impulsion of the Aire. And therefore in *Preaching*, you shall heare the *Preachers* Voice, better, before the Pulpit, than behinde it, or on the Sides, though it stand open. So a *Harquebuz*, or *Ordinance*, will bee further heard, forwards, from the Mouth of the *Peece*, than backwards, or on the Sides.

204

It may bee doubted, that *Sounds* doe move better, Downwards than

205

than Upwards. *Pulpits* are placed high above the People. And when the Ancient *Generalls* spake to their Armies, they had ever a Mount of Turfe cast up, whereupon they stood: But this may bee imputed to the Stops and Obstacles, which the voice meeteth with, when one speaketh upon the levell. But there seemeth to be more in it: For it may be, that *Spirituall Spices*, both of *Things Visible* and *Sounds*, doe move better *Downewards* than *Vpwards*. It is a strange Thing, that to Men standing below on the Ground, those that be on the Top of Pauls, seeme much lesse than they are, and cannot bee knowne; But to Men above, those below seeme nothing so much lessened, and may be knowne: yet it is true, that all things to them above, seeme also somewhat contracted, and better collected into Figure: as *Knots* in *Gardens* shew best from an Upper window, or Tarras.

206 But to make an exact Triall of it, let a Man stand in a *Chamber*, not much above the Ground, and speake out at the windowe, thorough a *Trunke*, to one standing on the Ground, as softly as hee can, the other laying his Eare close to the *Trunke*: Then *vià versa*, let the other speake *below* keeping the same Proportion of Softnesse; And let him in the *Chamber* lay his Eare to the *Trunck*: And this may bee the aptest Meanes, to make a Judgement, whether *Sounds* descend, or ascend, better.

Experiments in Consort touching the *Lasting* and *Perishing* of *Sounds*; And touching the *Time* they require to their *Generation*, or *Delation*.

207 AFter that *Sound* is created, (which is in a moment,) wee finde it continueth some smal time, melting by little and little. In this there is a wounderfull Errour amongst Men, who take this to be a *Continuance* of the Frst *Sound*; whereas (in truth) it is a *Renovation*, and not a *Continuance*: For the *Body percussed*, hath by reason of the *Percussion*, a *Trepidation* wrought in the *Minute Parts*; and so reneweth the *Percussion* of the *Aire*. This appeareth manifestly, because that the Melting *Sound* of a Bell, or of a String strucken, which is thought to bee a *Continuance*, ceaseth as soone as the Bell or String are touched. As in a Virginall, as soone as ever the Jacke falleth; and toucheth the String, the Sound ceaseth; And in a Bell, after you have chimed upon it, if you touch the Bell, the *Sound* ceaseth. And in this you must distinguish that there are two *Trepidations*: The one Manifest, and Locall; As of the Bell, when it is Pensile: The other Secret, of the Minute Parts; such as is described in the 9th Instance. But it is true, that the *Locall* helpeth the *Secret* greatly. We see likewise that in Pipes, and other winde Instruments, the *Sound* lasteth no longer, than the breath bloweth. It is true, that in Organs, there is a confused Murmur for a while; after you have plaied; But that is but while the Bellowes are in Falling.

208 It it certaine, that in the *Noise* of great *Ordnance*, where many are shot off together, the *Sound* will bee carried, (at the least) twenty Miles upon the land, and much further upon the Water. But then it will come to the Eare; Not in the Instant of the Shooting off, but it will come an Houre, or mor later. This must needs be a *Continuance* of the *First Sound*; For there is no *Trepidation* which should renew it. And the

the Touching of the *Ordnance* would not extinguish the *Sound* the sooner: So that in great *Sounds* the *Continuance* is more than Momentany.

209 To try exactly the time wherein *Sound* is *Delated*, Let a Man stand in a Steeple, and have with him a Taper; And let some Vaile be put before the Taper; And let another Man stand in the Field a Mile off. Then let him in the Steeple strike the Bell; And in the same Instant withdraw the Vaile; And so let him in the Field tell by his Pulse what distance of *Time* there is, betweene the *Light seene*, and the *Sound heard*: For it is certaine that the *Delation* of Light is in an Instant. This may be tried in farre greater Distances, allowing greater *Lights* and *Sounds*.

210 It is generally knowne and observed, that *Light*, and the *Object* of *Sight*, move swifter than *Sound*; For we see the *Flash* of a Peece is seene sooner, than the *Noise* is heard. And in Hewing wood, if one be some distance off, he shall see the Arme lifted up for a second Stroke, before he heare the Noise of the first. And the greater the Distance, the greater is the Prevention: As we see in Thunder, which is farre off; where the Lightning Precedeth the Cracke a good space.

211 *Colours*, when they represent themselves to the Eye, fade not, nor melt not by Degrees, but appeare still in the same Strength; But *Sounds* melt, and vanish, by little and little. The Cause is, for that *Colours* participate nothing with the *Motion* of the *Aire*; but *Sounds* doe. And it is a plaine Argument, that *Sound* participateth of some *Locall Motion*, of the *Aire*, (as a Cause *Sinè quâ non*,) in that, it perisheth so suddenly; For in every Section, or Impulsion of the *Aire*, the *Aire* doth suddenly restore and reunite it selfe; which the *Water* also doth, but nothing so swiftly.

Experiments in Consort touching the *Passage* and *Interceptions* of *Sounds*.

In the Trialls of the *Passage*, or *Not Passage* of *Sounds*, you must take heed, you mistake not the *Passing By the sides* of a Body, for the *Passing thorow* a Body: And therefore you must make the *Intercepting* Body very close; For *Sound* will passe thorow a small Chincke.

212 Where *Sound* passeth thorow a *Hard*, or *Close Body* (as thorow *Water*; thorow a *Wall*; thorow *Metall*, as in Hawkes Bells stopped; &c.) the *Hard*, or *Close Body*, must be but thinne and small; For else it deadeth and extinguisheth the *Sound* utterly. And therefore, in the *Experiment* of *Speaking in Aire under Water*, the Voice must not be very deepe within the *Water*: For then the *Sound* pierceth not. So if you speake on the further side of a *Close Wall*, if the *Wall* be very thicke, you shall not be heard: And if there were an Hogshead emptie, whereof the Sides were some two Foot thicke, and the Bunghole stopped; I conceive the Resounding Sound, by the *Communication* of the *Outward Aire*, with the *Aire within*, would be little or none: But onely you shall heare the *Noise* of the Outward Knocke, as if the Vessell were full.

It

213 It is certaine, that in the *Passage* of *Sounds* thorow *Hard Bodies*, the Spirit or Pneumaticall Part of the Hard body it selfe, doth cooperate; But much better, when the Sides of that *Hard Body* are strucke, than when the Percussion is onely within, without Touch of the Sides. Take therefore a Hawkes Bell, the holes stopped up, and hang it by a threed, within a Bottle Glasse; And stop the Mouth of the Glasse, very close with Wax; And then shake the Glasse, and see whether the Bell give any *Sound* at all, or how weake? But note, that you must in stead of the Threed, take a Wire; Or else let the Glasse have a great Belly; lest when you shake the Bell, it dash upon the Sides of the Glasse.

214 It is plaine, that a very *Long*, and *Downe-right Arch*, for the *Sound* to passe, will extinguish the *Sound* quite; So that that *Sound*, which would be heard over a wall, will not be heard over a Church; Nor that *Sound*, which will be heard, if you stand some distance from the wall, will be heard if you stand close under the wall.

215 *Soft* and *Foraminous Bodies*, in the *first Creation* of the *Sound*, will dead it; For the Striking against Cloth, or Furre, will make little *Sound*; As hath beene said: But in the *Passage* of the *Sound*, they will admit it better than *Harder Bodies*; As we see, that Curtaines, and Hangings, will not stay the *Sound* much; But Glasse-windowes, if they be very Close, will checke a *Sound* more, than the like Thickenesse of Cloth. Wee see also, in the Rumbling of the Belly, how easily the *Sound* passeth thorow the Guts, and Skin.

216 It is worthy the Enquiry, whether *Great Sounds*, (As of Ordnance, or Bells,) become not more *Weake*, and *Exile*, when they passe thorow *Small Crannies*. For the *Subtilties* of *Articulate Sounds*, (it may be,) may passe thorow *Small Crannies*, not confused; But the *Magnitude* of the *Sound* (perhaps,) not so well.

Experiments in Consort touching the *Medium* of *Sounds*.

THe *Mediums* of *Sounds* are *Aire*; *Soft* and *Porous Bodies*; Also *Water*. And *Hard Bodies* refuse not altogether to be *Mediums* of *Sounds*. But all of them are dull and unapt *Deferents*, except the *Aire*.

217 In *Aire*, the Thinner or Drier *Aire*, carrieth not the *Sound* so well, as the more Dense; As appeareth in *Night Sounds*; And *Evening Sounds*;

218 And *Sounds* in moist Weather, and Southerne Winds. The reason is already mentioned in the *Title* of *Majoration* of *Sounds*; Being for that *Thinne Aire* is better pierced; but *Thicke Aire* preserveth the *Sound* better from Wast; Let further Triall be made by Hollowing in Mists, and Gentle Showers: For (it may be) that will somewhat dead the *Sound*.

219 How farre forth *Flame* may be a *Medium* of *Sounds*, (especially of such *Sounds* as are created by *Aire*, and not betwixt *Hard Bodies*) let it be tryed, in *Speaking* where a *Bonfire* is betweene; But then you must allow, for some disturbance, the *Noise* that the *Flame* it selfe maketh.

220 Whether any other *Liquours*, being made *Mediums*, cause a Diversitie of *Sound* from *Water*, it may be tryed: As by the Knapping of the Tongs; Or Striking of the Bottome of a vessell, filled either with Milke,

or

or with Oyle; which though they be more light, yet are they more unequall Bodies than Aire.

Of the Natures *of the* Mediums, *we have now spoken; As for the* Disposition *of the said* Mediums, *it doth consist in the Penning, or not Penning of the* Aire; *Of which we have spoken before, in the* Title *of* Delation *of* Sounds: *It consisteth also in the* Figure *of the* Concave, *through which it passeth; Of which we will speake next.*

Experiments in Consort, what the *Figures* of the *Pipes*, or *Concaves*, or the *Bodies Deferent* conduce to the *Sounds*.

How the *Figures* of *Pipes*, or *Concaves*, through which *Sounds* passe; Or of other *Bodies deferent*; conduce to the Varietie and Alteration of the *Sounds*; Either in respect of the *Greater Quantitie*, or *lesse Quantitie* of *Aire*, which the *Concaves* receive; Or in respect of the *Carrying* of *Sounds* longer or shorter way; Or in respect of many other *Circumstances*; they have beene touched, as falling into other *Titles*. But those *Figures*, which we now are to speake of, wee intend to be, as they concerne the *Lines*, through which *Sound* passeth; As *Straight*; *Crooked*; *Angular*; *Circular*; &c.

221 The *Figure* of a *Bell* pertaketh of the *Pyramis*, but yet comming off, and dilating more suddenly. The *Figure* of a *Hunters Horne*, and *Cornet*, is oblique; yet they have likewise *Straight Hornes*; which if they be of the same Bore with the *Oblique*, differ little in *Sound*; Save that the Straight require somewhat a stronger Blast. The *Figures* of *Recorders*, and *Flutes*, and *Pipes* are straight; But the *Recorder* hath a lesse Bore, and a greater; Above, and below. The *Trumpet* hath the *Figure* of the *Letter S*: which maketh that Purling *Sound*, &c. Generally, the *Stright Line* hath the cleanest and roundest *Sound*, And the *Crooked* the more Hoarse, and Jarring.

222 Of a *Sinuous Pipe*, that may have some foure Flexions, Triall would be made. Likewise of a *Pipe*, made like a *Crosse*, open in the middest. And so likewise of an *Angular Pipe*: And see what will be the Effects of these severall *Sounds*. And so againe of a *Circular Pipe*; As if you take a *Pipe* perfect Round, and make a Hole whereinto you shall blow; And another Hole not farre from that; But with a Traverse or Stop between them; So that your Breath may goe the Round of the *Circle*, and come forth at the second Hole. You may trie likewise *Percussions* of *Solide Bodies* of severall *Figures*; As *Globes*, *Flats*, *Cubes*, *Crosses*, *Triangles*, &c. And their *Combinations*; As *Flat* against *Flat*; And *Convex* against *Convex*; And *Convex* against *Flat*, &c. And marke well the diversities of the *Sounds*. Trie also the difference in *Sound* of severall *Crassitudes* of *Hard Bodies* percussed; And take knowledge of the diversities of the *Sounds*. I my selfe have tried, that a *Bell* of *Gold* yeeldeth an excellent *Sound*, not inferiour to that of *Silver*, or *Brasse*, but rather better: yet wee see that a peece

peece of Money of *Gold* ſoundeth farre more flat than a peece of Money of *Silver*.

223 The *Harpe* hath the *Concave*, not along the *Strings*, but acroſſe the *Strings*; And no *Inſtrument* hath the *Sound* ſo Melting, and Prolonged, as the *Iriſh Harpe*. So as I ſuppoſe, that if a *Virginall* were made with a double *Concave*; the one all the length as the *Virginall* hath; the other at the End of the *Strings*, as the *Harpe* hath; It muſt needs make the *Sound* perfecter, and not ſo Shallow, and Jarring. You may trie it, without any Sound-Board along, but onely Harp-wiſe, at one End of the *Strings*: Or laſtly with a double *Concave*, at Each end of the *Strings* one.

Experiments in Conſort, touching the *Mixture* of *Sounds*.

224 THere is an apparent Diverſitie between the *Species Viſible*, and *Audible*, in this; That the *Viſible* doth not *mingle* in the *Medium*, but the *Audible* doth. For if we looke abroad, we ſee Heaven, a number of Stars, Trees, Hills, Men, Beaſts, at once. And the *Species* of the one doth not confound the other. But if ſo many *Sounds* came from ſeverall Parts, one of them would utterly confound the other. So wee ſee, that *Voices* or *Conſorts* of *Muſicke* doe make an Harmony by *Mixture*, which *Colours* doe not. It is true nevertheleſſe, that a great *Light* drowneth a ſmaller, that it cannot be ſeene; As the *Sunne* that of a *Gloworme*; as well as a Great *Sound* drowneth a leſſer. And I ſuppoſe likewiſe, that if there were two Lanthornes of Glaſſe, the one a Crimſin, and the other an Azure, and a Candle within either of them, thoſe Coloured Lights would mingle and caſt vpon a White Paper a Purple Colour. And even in *Colours*, they yeeld a faint and weake *Mixture*: For white walls make Roomes more lightſome than blacke, &c. But the Cauſe of the *Confuſion* in *Sounds*, and the *Inconfuſion* in *Species Viſible*, is, For that the *Sight* worketh in Right Lines, and maketh ſeverall *Cones*; And ſo there can be no Coincidence in the Eye, or Viſuall Point: But *Sounds*, that move in Oblique and Arcuate Lines, muſt needs encounter, and diſturbe the one the other.

225 The ſweeteſt and beſt *Harmony* is, when every *Part*, or *Inſtrument*, is not heard by it ſelfe, but a Conflation of them all; Which requireth to ſtand ſome diſtance off. Even as it is in the *Mixture* of Perfumes; Or the Taking of the Smells of ſeverall *Flowers* in the *Aire*.

226 The *Diſpoſition* of the *Aire*, in other *Qualities*, except it be joyned with *Sound*, hath no great Operation upon *Sounds*: For whether the *Aire* be lightſome or darke, hot or cold, quiet or ſtirring, (except it be with *Noiſe*) ſweet-ſmelling, or ſtinking, or the like; it importeth not much: Some petty Alteration or difference it may make.

227 But *Sounds* doe diſturbe and alter the one the other: Sometimes the one drowning the other, and making it not heard; Sometimes the one Jarring and diſcording with the other, and making a Confuſion; Sometimes the one Mingling and Compounding with the other, and making an Harmony.

228 Two *Voices* of like *lowdneſſe*, will not be heard, twice as farre, as one

of

of them alone; And two *Candles* of like light, will not make Things seeme twice as farre off, as one. The Cause is profound; But it seemeth that the *Impressions* from the *Objects* of the *Senses*, doe *mingle* respectively, every one with his kinde; But not in proportion, as is before demonstrated: And the reason may be, because the first *Impression*, which is from *Privative* to *Active*, (As from *Silence* to *Noise*, or from *Darkenesse* to *Light*,) is a greater Degree, than from *Lesse Noise*, to *More Noise*, or from *Lesse Light*, to *More Light*. And the Reason of that againe may be; For that the *Aire*, after it hath received a Charge, doth not receive a Surcharge, or greater Charge, with like Appetite, as it doth the first Charge. As for the Encrease of Vertue, generally, what Proportion it beareth to the Encrease of the Matter, it is a large Field, and to be handled by it selfe.

Experiments in Consort touching *Melioration* of *Sounds*.

229 ALL *Reflexions Concurrent* doe make *Sounds* Greater; But if the Body that createth, either, the Originall *Sound*, or the *Reflexion*, be cleane and smooth, it maketh them Sweeter. Triall may be made of a *Lute*, or *Violl*, with the Belly of polished Brasse, in stead of Wood. Wee see that even in the Open Aire, the *wire String* is sweeter, than the *string* of *Guts*. And wee see that for *Reflexion*, *Water* excelleth; As in *Musicke* neare the *water*; Or in *Eccho's*.

230 It hath beene tried, that a *Pipe* a little moistned on the inside, but yet so as there be no Drops left, maketh a more solemne *Sound*, than if the *Pipe* were dry: But yet, with a sweet Degree of *Sibilation*, or *Purling*; As we touched it before in the title of *Equalitie*. The Cause is, for that all Things Porous, being superficially wet, and (as it were) betweene dry and wet, become a little more Even and Smooth; But the Purling, (which must needs proceed of Inequalitie,) I take to be bred between the Smoothnesse of the inward Surface of the *Pipe*, which is wet; And the Rest of the Wood of the *Pipe*, unto which the Wet commeth not, but it remaineth dry.

231 In *Frosty weather*, *Musicke* within doores soundeth better. Which may be, by reason, not of the Disposition of the *Aire*, but of the *Wood* or *String* of the *Instrument*, which is made more Crispe, and so more porous and hollow: And we see that *Old Lutes* sound better than *New*, for the same reason. And so doe *Lute-strings* that have beene kept long.

232 *Sound* is likewise *Meliorated* by the *Mingling* of *Open Aire* with *Pent Aire*; Therefore Triall may be made, of a *Lute* or *Violl* with a double Belly; Making another Belly with a Knot over the Strings; yet so, as there be Roome enough for the Strings, and Roome enough to play below that Belly. Triall may be made also of an *Irish Harpe*, with a Concave on both Sides; Whereas it useth to have it but on one Side. The doubt may be, lest it should make too much Resounding; whereby one Note would overtake another.

233 If you sing into the Hole of a *Drum*, it maketh the *Singing* more sweet.

sweet. And so I conceive it would, if it were a *Song* in Parts, sung into severall *Drums*; And for handsomnesse and strangenesse sake, it would not be amisse to have a Curtaine betweene the Place where the *Drums* are, and the *Hearers*.

234 When a *Sound* is created in a *wind-Instrument*, betweene the *Breath* and the *Aire*, yet if the *Sound* be communicate with a more equall Body of the *Pipe*, it *meliorateth* the *Sound*. For (no doubt) there would be a differing *Sound* in a Trumpet, or *Pipe* of *Wood*; And againe in a *Trumpet* or *Pipe* of *Brasse*. It were good to try *Recorders* and *Hunters Hornes* of *Brasse*, what the *Sound* would be.

235 *Sounds* are *meliorated* by the *Intension* of the *Sense*, where the *Common-Sense* is collected most, to the *particular Sense* of *Hearing*, and the *Sight* suspended: And therefore, *Sounds* are sweeter, (as well as greater,) in the *Night*, than in the *Day*; And I suppose, they are sweeter to blind Men, than to Others: And it is manifest, that betweene *Sleeping* and *Waking*, (when all the *Senses* are bound and suspended) *Musicke* is farre sweeter, than when one is *fully Waking*.

Experiments in Consort touching the *Imitation* of *Sounds*.

236 IT is a Thing strange in Nature, when it is attentively considered; How *Children*, and some *Birds*, learne to *imitate Speech*. They take no Marke (at all) of the *Motion* of the *Mouth* of Him that speaketh; For *Birds* are as well taught in the Darke, as by Light. The *Sounds* of *Speech* are very Curious and Exquisite: So one would thinke it were a Lesson hard to learne. It is true, that it is done with time, and by little and little, and with many Essayes and Proffers: But all this dischargeth not the Wonder. It would make a Man thinke (though this which wee shall say may seeme exceeding strange) that there is some *Transmission* of Spirits; and that the *Spirits* of the *Teacher* put in Motion, should worke with the *Spirits* of the *Learner*, a Pre-disposition to offer to *Imitate*; And so to perfect the *Imitation* by degrees. But touching *Operations* by *Transmissions* of *Spirits*, (which is one of the highest Secrets in Nature,) wee shall speake in due place; Chiefly when wee come to enquire of *Imagination*. But as for *Imitation*, it is certaine, that there is in Men, and other Creatures, a pre-disposition to *Imitate*. We see how ready Apes and Monkies are, to *imitate* all Motions of Man: And in the Catching of Dottrells, we see, how the Foolish Bird playeth the Ape in Gestures: And no Man (in effect) doth accompany with others, but he learneth, (ere he is aware,) some Gesture, or Voice, or Fashion of the other.

237 In *Imitation* of *Sounds*, that *Man* should be the *Teacher*, is no Part of the Matter; For *Birds* will learne one of another; And there is no Reward, by feeding, or the like, given them for the *Imitation*; And besides, you shall have Parrots, that will not onely *imitate* Voices, but Laughing, Knocking, Squeaking of a Doore upon the Hinges, or of a Cart-wheele; And (in effect) any other *Noise* they heare.

238 No *Beast* can *imitate* the *Speech* of *Man*, but *Birds* onely; For the Ape

it

it selfe, that is so ready to *imitate* otherwise, attaineth not any degree of *Imitation* of Speech. It is true, that I have knowne a Dog, that if one howled in his Eare, he would fall a howling a great while. What should be the Aptnesse of *Birds*, in comparison of *Beasts*, to *imitate* the *Speech* of *Man*, may be further enquired. Wee see that *Beasts* have those Parts, which they count the *Instruments* of *Speech*, (as *Lips*, *Teeth*, &c.) liker unto *Man*, than *Birds*. As for the *Necke*, by which the *Throat* passeth; we see many *Beasts* have it, for the Length, as much as *Birds*. What better *Gorge*, or Artire, *Birds* have, may be further enquired. The *Birds* that are knowne to be Speakers, are, *Parrats*, *Pyes*, *Iayes*, *Dawes*, and *Ravens*. Of which *Parrots* have an adunque Bill, but the rest not.

But I conceive, that the *Aptnesse* of *Birds*, is not so much in the *Conformitie* of the *Organs* of *Speech*, as in their *Attention*. For *Speech* must come by *Hearing*, and *Learning*; And *Birds* give more heed, and marke *Sounds*, more than *Beasts*; Because naturally they are more delighted with them, and practise them more; As appeareth in their *Singing*. We see also, that those that teach *Birds* to sing, doe keepe them Waking, to increase their *Attention*. We see also, that *Cock-Birds*, amongst *Singing-Birds*, are ever the better *Singers*; which may be, because they are more lively, and listen more. 239

Labour, and *Intention* to *imitate voices*, doth conduce much to *Imitation*: And therefore we see, that there be certaine *Pantomimi*, that will represent the voices of *Players* of *Enterludes*, so to life, as if you see them not, you would thinke they were those *Players* themselves; And so the *Voices* of other *Men* that they heare. 240

There have beene some, that could counterfeit the *Distance* of *Voices*, (which is a *Secondary Object* of *Hearing*,) in such sort; As when they stand fast by you, you would thinke the *Speech* came from a farre off, in a fearefull manner. How this is done, may be further enquired. But I see no great use of it, but for Imposture, in counterfeiting Ghosts or Spirits. 241

Experiments in Consort, touching the *Reflexion* of *Sounds*.

There be three Kindes of *Reflexions* of *Sounds*, A *Reflexion Concurrent*; A *Reflexion Iterant*, which we call *Eccho*; And a *Super-reflexion*, or an *Eccho* of an *Eccho*, whereof the first hath beene handled in the *Title* of *Magnitude* of *Sounds*: The Latter two we will now speake of.

The *Reflexion* of *Species Visible*, by *Mirrours*, you may command; Because passing in Right Lines, they may be guided to any Point: But the *Reflexion* of *Sounds* is hard to master; Because the *Sound* filling great Spaces in Arched Lines, cannot be so guided: And therefore we see there hath not beene practised, any Meanes to make *Artificiall Eccho's*. And no *Eccho* already knowne returneth in a very narrow Roome. 242

The *Naturall Eccho's* are made upon *Walls*, *Woods*, *Rockes*, *Hills*, and *Banckes*; As for *Waters*, being neare, they make a *Concurrent Eccho*; But 243

being further off, (as upon a large *River*) they make an *Iterant Eccho*: For there is no difference between the *Concurrent Eccho*, and the *Iterant*, but the Quickneſſe, or Slowneſſe of the Returne. But there is no doubt, but *Water* doth helpe the *Delation* of *Eccho*; as well as it helpeth the *Delation* of *Originall Sounds*.

244 It is certaine, (as hath beene formerly touched,) that if you ſpeake thorow a *Trunke*, ſtopped at the further end, you ſhall finde a Blaſt returne upon your Mouth, but no *Sound* at all. The *Cauſe* is, for that the *Cloſeneſſe*, which preſerveth the *Originall*, is not able to preſerve the *Reflected Sound*: Beſides that *Eccho's* are ſeldom created, but by loud *Sounds*. And therfore there is leſſe hope of *Artificiall Eccho's* in Aire, pent in a narrow Concave. Nevertheleſſe it hath beene tried, that One leaning over a *Well*, of 25. Fathome deepe, and ſpeaking, though but ſoftly, (yet not ſo ſoft as a whiſper,) the *water* returned a good *Audible Eccho*. It would be tried, whether Speaking in *Caves*, where there is no Iſſue, ſave where you ſpeake, will not yeeld *Eccho's*, as *Wells* doe.

245 The *Eccho* commeth as the *Originall Sound doth*, in a Round Orbe of Aire: It were good to try the Creating of the *Eccho*, where the Body Repercuſſing maketh an Angle: As againſt the Returne of a Wall, &c. Alſo we ſee that in *Mirrours*, there is the like Angle of Incidence, from the Object to the Glaſſe, and from the Glaſſe to the Eye. And if you ſtrike a *Ball* ſide-long, not full upon the Surface, the Rebound will be as much the contrary way; Whether there bee any ſuch *Reſilience* in *Eccho's*, (that is, whether a Man ſhall heare better, if he ſtand aſide the Body Repercuſſing, than if he ſtand where he ſpeaketh, or any where in a right Line betweene;) may be tried. Triall likewiſe would be made, by Standing nearer the Place of Repercuſſing, than he that ſpeaketh; And againe by Standing further off, than hee that ſpeaketh; And ſo knowledge would be taken, whether *Eccho's*, as well as *Originall Sounds*, be not ſtrongeſt neare hand.

246 There be many Places, where you ſhall heare a number of *Eccho's*, one after another: And it is, when there is Variety of *Hills*, or *Woods*, ſome nearer, ſome further off: So that the Returne from the further, being laſt created, will be likewiſe laſt heard.

247 As the *Voice* goeth round, as well towards the Backe, as towards the Front of him that ſpeaketh; So likewiſe doth the *Eccho*; For you have many Back-*Eccho's* to the Place where you ſtand.

248 To make an *Eccho*, that will report, three, or foure, or five Words, diſtinctly, it it requiſite, that the *Body Repercuſſing*, be a good diſtance off: For if it be neare, and yet not ſo neare, as to make a *Concurrent Eccho*, it choppeth with you upon the ſudden. It is requiſite likewiſe, that the *Aire* be not much *pent*. For *Aire*, at a great diſtance, *pent*, worketh the ſame effect with *Aire*, *at large*, in a ſmall diſtance. And therefore in the *Triall* of *Speaking* in the *well*, though the *well* was deepe, the *Voice* came backe, ſuddenly; And would beare the Report but of two Words.

For

For *Eccho's* upon *Eccho's*, there is a rare Instance thereof in a Place, which I will now exactly describe. It is some three or foure Miles from *Paris*, neere a Towne called *Pont-Charenton*; And some Bird-bolt shot, or more, from the River of *Seane*. The Roome is a *Chappell*, or small *Church*. The Walls all standing, both at the Sides, and at the Ends. Two Rowes of Pillars, after the manner of Isles of *Churches*, also standing; The Roofe all open, not so much as any Embowment neere any of the walls left. There was against every Pillar, a Stacke of Billets, above a Mans Height; which the Watermen, that bring Wood downe the *Seane*, in Stacks, and not in Boats, laid there (as it seemeth) for their ease. Speaking at the one End, I did heare it returne the Voice thirteene severall times; And I have heard of others, that it would returne sixteene times: For I was there about three of the Clocke in the afternoone: And it is best, (as all other *Eccho's* are) in the Evening. It is manifest, that it is not *Eccho's* from severall places, but a *Tossing* of the *Voice*, as a Ball, to and fro; Like to *Reflexions* in *Looking-glasses*; where if you place one *Glasse* before, and another behinde, you shall see the *Glasse* behinde with the *Image*, within the *Glasse* before; And againe, the *Glasse* before in that; and divers such *Super-Reflexions*, till the *species speciei* at last die. For it is every Returne weaker, and more shady. In like manner, the *Voice* in that *Chappell*, createth *speciem speciei*, and maketh succeeding *Super-Reflexions*; For it melteth by degrees, and every *Reflexion* is weaker than the former: So that, if you speake three Words, it will (perhaps) some three times report you the whole three Words; And then the two latter Words for some times; And then the last Word alone for some times; Still fading, and growing weaker. And whereas in *Eccho's* of one Returne, it is much to heare foure or five Words; In this *Eccho* of so many Returnes, upon the matter, you heare above twenty Words, for three. 249

The like *Eccho* upon *Eccho*, but only with two Reports, hath beene observed to be, if you stand betweene a *House*, and a *Hill*, and lure towards the *Hill*. For the *House* will give a *Backe-Eccho*; One taking it from the other, and the latter the weaker. 250

There are certaine *Letters*, that an *Eccho* will hardly expresse; As *S*, for one; Especially being Principall in a Word. I remember well, that when I went to the *Eccho* at *Pont-Charenton*, there was an Old *Parisian*, that tooke it to be the Worke of Spirits, and of good Spirits. For, (said he) call *Satan*, and the *Eccho* will not deliver backe the Devils name; But will say, *Vat'en*; Which is as much in *French*, as *Apage*, or *Avoid*. And thereby I did hap to finde, that an *Eccho* would not returne *S*, being but a Hissing and an *Interiour Sound*. 251

Eccho's are some more sudden, and chop againe, as soone as the *Voice* is delivered; As hath beene partly said: Others are more deliberate, that is, give more Space betweene the *Voice*, and the *Eccho*; which is caused by the locall Neareneſſe, or Distance: Some will report a longer Traine of Words; And some a shorter: Some more loud (full as loud as the *Originall*, 252

ginall, and sometimes more loud;) And some weaker and fainter.

253 Where *Eccho's* come from severall Parts, at the same distance, they must needs make (as it were) a Quire of *Eccho's*; and so make the Report greater, and even a *Continued Eccho*; which you shall find in some *Hills*, that stand encompassed, Theater-like.

254 It doth not yet appeare, that there is *Refraction* in *Sounds*, as well as in *Species Visible*. For I doe not thinke, that if a *Sound* should passe through divers *Mediums*, (as *Aire*, *Cloth*, *Wood*) it would deliver the *Sound*, in a differing Place, from that unto which it is deferred; which is the Proper Effect of *Refraction*. But *Majoration* which is also the Worke of *Refraction*, appeareth plainly in *Sounds*, (as hath beene handled at full;) But it is not by Diversitie of *Mediums*.

Experiments in Consort, touching the *Consent* and *Dissent* beween *Visibles* and *Audibles*.

Wee have *obiter*, for Demonstrations sake, used in divers *Instances*, the *Examples* of the *Sight*, and *Things Visible*, to illustrate the *Nature* of *Sounds*. But we thinke good now to prosecute that *Comparison* more fully.

CONSENT OF VISIBLES, and Audibles.

255 *Both* of them *spread themselves in Round*, and fill a whole Floare or Orbe, unto certaine Limits: And are carried a great way: And doe languish and lessen by degrees, according to the Distance of the Objects from the Sensories.

256 *Both* of them have the whole *Species in euery small Portion of the Aire*, or *Medium*; So as the *Species* doe passe through small Crannies, without Confusion: As we see ordinarily in *Levels*, as to the *Eye*; And in *Crannies*, or *Chinks*, as to the *Sound*.

257 *Both* of them are of a *sudden and easie Generation* and *Delation*; And likewise *perish swiftly*, and *suddenly*; As if you remove the *Light*; Or touch the *Bodies* that give the *Sound*.

258 *Both* of them doe *receive* and *carry exquisite* and *accurate Differences*; As of Colours, Figures, Motions, Distances, in *Visibles*; And of Articulate Voices, Tones, Songs, and Quaverings, in *Audibles*.

259 *Both* of them in their Vertue and Working, do not appeare to *emit any Corporall Substance* into their *Mediums*, or the Orbe of their Vertue; Neither againe to raise or stirre any *evident locall Motion* in their *Mediums*, as they passe; But only to carry certaine *Spirituall Species*; The perfect Knowledge of the Cause whereof, being hitherto scarcely attained, we shall search and handle in due place.

260 *Both* of them seeme not to *generate* or *produce* any other *Effect in Nature*,

ture, but such as appertaineth to their proper Objects, and Senses, and are otherwise Barren.

But *Both* of them in their owne proper Action, doe worke three manifest *Effects*. The First, in that the *Stronger Species drowneth the Lesser*; As the Light of the Sunne, the light of a Glow-worme; The Report of an Ordnance, the Voice: The Second, in that an *Object of Surcharge or Excesse destroyeth the Sense*; As the Light of the Sunne the Eye, a violent *Sound* (neare the Eare) the Hearing: The Third, in that *both of them will be reverberate*; As in *Mirrours*; And in *Eccho's*. 261

Neither of them doth *destroy or hinder the Species of the other*, although they *encounter* in the same *Medium*; As Light or Colour hinder not *Sound*; Nor *è contrà*. 262

Both of them *affect the Sense in Living Creatures*, and yeeld *Objects of Pleasure and Dislike*: Yet nevertheless, the *Objects* of them doe also (if it be well observed) affect and worke upon dead Things; Namely, such as have some Conformity with the *Organs* of the two *Senses*; As *Visibles* worke upon a *Looking-glasse*, which is like the Pupill of the Eye; And *Audibles* upon the Places of *Eccho*, which resemble, in some sort, the Caverne and structure of the Eare. 263

Both of them doe *diversly worke, as they have their Medium diversly disposed*. So a Trembling *Medium* (as Smoake) maketh the Object seeme to tremble; and a Rising or Falling *Medium* (as Winds) maketh the *Sounds* to rise, or fall. 264

To *Both*, the *Medium*, which is the most Propitious and Conducible, is *Aire*; For Glasse or Water, &c. are not comparable. 265

In *Both* of them, where the *Object is Fine and Accurate*, it conduceth much to have the *Sense Intentive, and Erect*; In so much as you contract your *Eye*, when you would see sharply; And erect your *Eare*, when you would heare attentively; which in Beasts that have Eares moveable, is most manifest. 266

The *Beames* of *Light*, when they are *multiplied*, and *conglomerate*, generate *Heat*; which is a different Action, from the Action of *Sight*: And the *Multiplication* and *Conglomeration* of *Sounds* doth generate an extreme *Rarefaction* of the *Aire*; which is an Action materiate, differing from the Action of *Sound*; If it bee true (which is anciently reported) that *Birds*, with great shouts, have fallen downe. 267

DISSENTS OF VISIBLES, and Audibles.

268 THe *Species* of *Visibles* seeme to bee *Emissions* of *Beames* from the *Object seene*; Almost like Odours; save that they are more Incorporeall: But the *Species* of *Audibles* seeme to Participate more with *Locall Motion*, like *Percussions*, or *Impressions* made upon the *Aire*. So that whereas all Bodies doe seeme to worke in two manners; Either by the *Communication* of their *Natures*; Or by the *Impressions* and *Signatures* of their *Motions*; The *Diffusion* of *Species Visible* seemeth to participate more of the former *Operation*; and the *Species Audible* of the latter.

269 The *Species* of *Audibles* seeme to bee carried more manifestly thorow the *Aire*, than the *Species* of *Visibles*: For (I conceive) that a Contrary strong Wind will not much hinder the Sight of *Visibles*, as it will doe the Hearing of *Sounds*.

270 There is one *Difference*, above all others, betweene *Visibles* and *Audibles*, that is the most remarkable; as that whereupon many smaller Differences doe depend: Namely, that *Visibles*, (except *Lights*,) are *carried in Right Lines*; and *Audibles* in *Arcuate Lines*. Hence it commeth to passe, that *Visibles* doe not intermingle, and confound one another, as hath beene said before; But *Sounds* doe. Hence it commeth, that the Solidity of Bodies doth not much hinder the Sight, so that the Bodies be cleare, and the Pores in a Right Line, as in Glasse, Chrystall, Diamonds, Water, &c. But a thin Scarfe, or Handkerchiefe, though they be Bodies nothing so solide, hinder the Sight: Whereas (contrariwise) these Porous Bodies doe not much hinder the Hearing, but solide Bodies doe almost stop it, or at the least attenuate it. Hence also it commeth, that to the *Reflexion* of *Visibles*, small Glasses suffice; but to the *Reverberation* of *Audibles*, are required greater Spaces, as hath likewise beene said before.

271 *Visibles* are seene further off, than *Sounds* are heard; Allowing nevertheless the *Rate* of their *Bignesse*: For otherwise a *great Sound* will be heard further off, than a *Small Body* seene.

272 *Visibles* require (generally) some *Distance* betweene the *Object*, and the *Eye*, to bee better seene; Wheras in *Audibles*, the nearer the Approch of the *Sound* is to the Sense, the better. But in this there may be a double Errour. The one, because to *Seeing*, there is required *Light*; And any thing that toucheth the Pupill of the Eye (all over,) excludeth the *Light*. For I have heard of a Person very credible, (who himselfe was cured of a Cataract in one of his Eyes,) that while the Silver Needle did worke upon the Sight of his Eye, to remove the Filme of the Cataract,

ract, he never saw any thing more cleare or perfect, than that white Needle: Which (no doubt,) was, because the Needle was lesser than the *Pupill* of the *Eye*, and so tooke not the Light from it. The other Errour may be, for that the *Object* of *Sight* doth strike upon the *Pupill* of the *Eye*, directly without any interception; whereas the *Cave* of the *Eare* doth hold off the *Sound* a little from the Organ: And so nevertheless there is some *Distance* required in both.

Visibles are swiftlier carried to the *Sense*, than *Audibles*; As appeareth in Thunder and Lightning; Flame and Report of a Peece; Motion of the Aire in Hewing of Wood. All which have beene set downe heretofore, but are proper for this *Title*. 273

I conceive also, that the *Species* of *Audibles* doe hang longer in the Aire, than those of *Visibles*: For although even those of *Visibles*, doe hang some time, as we see in *Rings turned*, that shew like Spheres; In *Lute-strings* fillipped; A *Fire-brand* caried along, which leaveth a Traine of Light behinde it; and in the *Twilight*; And the like: Yet I conceive that *Sounds* stay longer, because they are carried up and downe with the Winde: And because of the Distance of the Time, in *Ordnance discharged*, and *heard* twenty Miles off. 274

In *Visibles*, there are not found Objects so odious and ingrate to the *Sense*, as in *Audibles*. For foule *Sights* doe rather displease, in that they excite the Memory of foule Things, than in the immediate Objects. And therefore in *Pictures*, those foule Sights doe not much offend; But in *Audibles*, the Grating of a Saw, when it is sharpned, doth offend so much, as it setteth the Teeth on Edge. And any of the *harsh Discords* in *Musicke*, the Eare doth straight-wayes refuse. 275

In *Visibles*, after great Light, if you come suddenly into the *Darke*; Or contrariwise, out of the *Darke* into a *Glaring light*, the Eye is dazled for a time, and the *Sight* confused; But whether any such Effect be after great *Sounds*, or after *a deepe Silence*, may be better enquired. It is an old Tradition, that those that dwell neare the *Cataracts* of *Nilus*, are strucken deafe: But we finde no such effect, in Cannoniers, nor Millers, nor those that dwell upon Bridges. 276

It seemeth that the *Impression* of *Colour* is so weake, as it worketh not but by a Cone of Direct *Beames*, or Right Lines; whereof the Basis is in the Object, and the Verticall Point in the Eye; So as there is a Corradiation and Conjunction of *Beames*; And those *Beames* so sent forth, yet are not of any force to beget the like borrowed or second *Beames*, except it be by *Reflexion*, whereof we speake not. For the *Beames* passe, and give little Tincture to that Aire, which is Adjacent; which if they did, we should see *Colours* out of a Right line. But as this is in *Colours*; so otherwise it is in the *Body* of *Light*. For when there is a Skreene between the Candle and the Eye, yet the *Light* passeth to the Paper whereon One writeth; So that the *Light* is seene, where the Body of the *Flame* is not seene; And where any *Colour* (if it were placed where the Body of the *Flame* is) would not be seene. I judge that *Sound* is of this Latter Nature: 277

ture: For when two are placed on both ſides of a Wall, and the Voice is heard, I judge it is not onely the *Originall Sound*, which paſſeth in an *Arched Line*; But the *Sound*, which paſſeth above the Wall in a Right Line, begetteth the like Motion round about it, as the firſt did, though more weake.

Experiments in Conſort, touching the *Sympathy* or *Antipathy* of *Sounds*, one with another.

278 ALL *Concords* and *Diſcords* of *Muſicke*, are (no doubt) *Sympathies*, and *Antipathies* of *Sounds*. And ſo (likewiſe) in that *Muſicke*, which we call *Broken Muſicke*, or *Conſort Muſicke*; Some *Conſorts* of *Inſtruments* are ſweeter than others; (A Thing not ſufficiently yet obſerved:) As the *Iriſh Harpe*, and *Baſe Viall* agree well: The *Recorder* and *Stringed Muſicke* agree well: *Organs* and the *Voice* agree well; &c. But the *Virginalls* and the *Lute*; Or the *Welch-Harpe*, and *Iriſh-Harpe*; Or the *Voice* and *Pipes* alone, agree not ſo well; But for the *Melioration* of *Muſicke*, there is yet much left (in this Point of *Exquiſite Conſorts*) to try and enquire.

279 There is a Common Obſervation, that if a *Lute*, or *Viall*, be layed upon the Backe, with a ſmall Straw upon one of the *Strings*; And another *Lute* or *Viall* be laid by it; And in the other *Lute*, or *Viall*, the *Vniſon* to that *String* be ſtrucken; it will make the *String* move; Which will appeare both to the Eye, and by the *Strawes* Falling off. The like will be, if the *Diapaſon* or *Eight* to that *String* be ſtrucken, either in the ſame *Lute*, or *Viall*, or in others lying by; But in none of theſe there is any Report of *Sound*, that can be diſcerned, but onely Motion.

280 It was deviſed, that a *Viall* ſhould have a Lay of Wire Strings below, as cloſe to the Belly, as a *Lute*; And then the *Strings* of Guts mounted upon a Bridge, as in Ordinary *Vialls*; To the end, that by this means, the upper *Strings* ſtrucken, ſhould make the lower reſound by *Sympathy*, and ſo make the *Muſicke* the better; Which, if it be to purpoſe, then *Sympathy* worketh, as well by Report of *Sound*, as by *Motion*. But this device I conceive to be of no uſe; becauſe the upper *Strings*, which are ſtopped in great variety, cannot maintaine a *Diapaſon* or *Vniſon*, with the Lower, which are never ſtopped. But if it ſhould be of uſe at all; it muſt be in *Inſtruments* which have no Stops; as *Virginalls*, and *Harpes*; wherein triall may be made of two Rowes of Strings, diſtant the one from the other.

281 The *Experiment* of *Sympathy* may be transferred (perhaps) from *Inſtruments* of *Strings*, to other *Inſtruments* of *Sound*. As to try if there were in one Steeple, two *Bells* of *Vniſon*, whether the ſtriking of the one would move the other, more than if it were another Accord: And ſo in *Pipes*, (if they be of equall Bore, and *Sound*,) whether a little Straw or Feather would move in the one *Pipe*, when the other is blowne at an *Vniſon*.

282 It ſeemeth, both in *Eare*, and *Eye*, the *Inſtrument* of *Senſe* hath a *Sympathy* or Similitude with that which giveth the *Reflexion*; (As hath beene touched before.) For as the *Sight* of the *Eye* is like a Cryſtall, or Glaſſe, or Water; So is the *Eare* a ſinuous Cave, with a hard Bone, to

ſtop

ſtop and reverberate the *Sound*: Which is like to the Places that report *Eccho's*.

WHen a Man *Yawneth*, he cannot *Heare* ſo well. The *Cauſe* is, for that the *Membrane* of the *Eare* is extended; And ſo rather caſteth off the *Sound*, than draweth it to. Experiments in Conſort, touching the *Hindring* or *Helping* of the *Hearing*. 283

We *Heare* better when we *hold our Breath*, than contrary; In ſo much as in all Liſtening to attaine a *Sound* a farre off, Men *hold their Breath*. The *Cauſe* is, For that in all *Expiration*, the Motion is Outwards; And therefore, rather driveth away the voice, than draweth it: And beſides we ſee, that in all *Labour* to doe things with any ſtrength, wee *hold the Breath*: And liſtening after any *Sound*, that is heard with difficultie, is a kinde of *Labour*. 284

Let it be tryed, for the *Helpe* of the *Hearing*, (and I conceive it likely to ſucceed,) to make an *Inſtrument* like a *Tunnell*; The narrow Part whereof may be of the Bigneſſe of the Hole of the *Eare*; And the Broader End much larger, like a *Bell* at the Skirts; And the length halfe a foot, or more. And let the narrow End of it be ſet cloſe to the *Eare*: And marke whether any *Sound*, abroad in the open Aire, will not be heard diſtinctly, from further diſtance, than without that Inſtrument; being (as it were) an *Eare-Spectacle*. And I have heard there is in *Spaine*, an *Inſtrument* in uſe to be ſet to the *Eare*, that *helpeth* ſomewhat thoſe that are Thicke of Hearing. 285

If the *Mouth* be ſhut cloſe, nevertheleſſe there is yeelded by the Roofe of the Mouth, a Murmur. Such as is uſed by dumbe Men: But if the *Noſtrills* be likewiſe ſtopped, no ſuch Murmur can be made; Except it be in the Bottome of the Pallate towards the Throat. Whereby it appeareth manifeſtly, that a *Sound* in the *Mouth*, except ſuch as aforeſaid, if the *Mouth* be ſtopped, paſſeth from the *Pallate*, thorow the *Noſtrills*. 286

THe *Repercuſſion* of *Sounds*, (which we call *Eccho*,) is a great Argument of the *Spirituall Eſſence* of *Sounds*. For if it were *Corporeall*, the Repercuſſion ſhould be created in the ſame manner, and by like *Inſtruments*, with the *Originall Sound*: But we ſee what a Number of *Exquiſite Inſtruments* muſt concurre in Speaking of Words, whereof there is no ſuch Matter in the Returning of them; But onely a plaine Stop, and *Repercuſſion*. Experiments in Conſort, touching the *Spirituall* and *Fine Nature* of *Sounds*. 287

The Exquiſite *Differences* of *Articulate Sounds*, carried along in the *Aire*, ſhew that they cannot be *Signatures* or *Impreſſions* in the *Aire*, as hath beene well refuted by the Ancients. For it is true, that Seales make excellent Impreſſions: And ſo it may be thought of *Sounds* in their firſt Generation: But then the *Delation* and *Continuance* of them without any new Sealing, ſhew apparently they cannot be Impreſſions. 288

All *Sounds* are ſuddenly made, and doe ſuddenly periſh; But neither that, nor the *Exquiſite Differences* of them, is Matter of ſo great Admiration: For the Quaverings, and Warblings in Lutes, and Pipes, 289

are

are as swift; And the Tongue, (which is no very fine Instrument,) doth in Speech, make no fewer Motions, than there be Letters in all the Words, which are uttered. But that *Sounds* should not onely be so speedily generated, but carried so farre every way, in such a momentany time, deserveth more Admiration. As for Example; If a Man stand in the middle of a Field, and speake aloud, he shall be heard a Furlong in round; And that shall be in *Articulate Sounds*; And those shall be Entire in every little Portion of the Aire; And this shall be done in the Space of lesse than a Minute.

290 The *Sudden Generation* and *Perishing* of *Sounds*, must be one of these two Wayes. Either that the *Aire* suffereth some Force by *Sound*, and then restoreth it selfe; As Water doth; Which being divided, maketh many Circles, till it restore it selfe to the naturall Consistence: Or otherwise, that the *Aire* doth willingly imbibe the *Sound* as gratefull, but cannot maintaine it; For that the *Aire* hath (as it should seeme) a secret and hidden Appetite of Receiving the *Sound* at the first; But then other Grosse and more Materiate Qualities of the Aire straight-wayes suffocate it; Like unto *Flame*, which is generated with Alacritie, but straight quenched by the Enmitie of the *Aire*, or other Ambient Bodies.

There be these *Differences* (in generall) by which *Sounds* are divided; 1. *Musicall*, *Immusicall*; 2. *Treble*, *Base*; 3. *Flat*, *Sharpe*; 4. *Soft*, *Loud*; 5. *Exteriour*, *Interiour*; 6. *Cleane*, *Harsh* or *Purling*; 7. *Articulate*, *Inarticulate*.

We have laboured (as may appeare,) in this *Inquisition* of *Sounds*, diligently; Both becaus *Sound* is one of the most Hidden Portions of *Nature*, (as we said in the beginning:) And becaus it is a *Vertue* which may be called *Incorporeall*, and *Immateriate*; whereof there be in *Nature* but few. Besides, we were willing, (now in these our first *Centuries*,) to make a Patterne or President of an *Exact Inquisition*; And we shall doe the like hereafter in some other Subjects which require it. For wee desire that Men should learne and perceive, how severe a Thing the true *Inquisition* of *Nature* is; And should accustome themselves, by the light of Particulars, to enlarge their Mindes, to the Amplitude of the World; And not reduce the World to the Narrownesse of their Mindes.

Experiment Solitary touching the *Ori-*

Metalls give *Orient* and *Fine Colours* in *Dissolutions*; As *Gold* giveth an excellent Yellow; *Quick-Silver* an excellent Greene; *Tinne* giveth

giveth an excellent Azure: Likewise in their *Putrefactions*, or *Rusts*; As *Vermilion*, *Verdegrease*, *Bise*, *Cirrus*, &c. And likewise in their *Vitrifications*. The *Cause* is, for that by their Strength of Body, they are able to endure the Fire, or Strong Waters, and to be put into an Equall Posture; And againe to retaine Part of their principall Spirit; Which two Things, (Equall Posture, and Quicke Spirits) are required chiefely, to make *Colours* lightsome.

ent Colours, in dissolution of Metalls. 291

IT conduceth unto *Long life*, and to the more Placide Motion of the Spirits, which thereby doe lesse prey and consume the Juyce of the Body; Either that *Mens Actions be free and voluntary*; That nothing be done *Invitâ Minervâ*, but *Secundum Genium*: Or on the other side, that the *Actions* of *Men be full of Regulation, and Commands within themselves*: For then the Victory and Performing of the Command, giveth a good Disposition to the Spirits; Especially if there be a Proceeding from Degree to Degree; For then the Sense of Victory is the greater. An example of the former of these, is in a Countrey life; And of the latter, in *Monkes* and *Philosophers*, and such as doe continually enjoyne themselves.

Experiment Solitary touching *Prolongation* of *Life*. 292

IT is certaine, that in all Bodies, there is an *Appetite* of *Vnion*, and Evitation of Solution of Continuitie: And of this *Appetite* there be many *Degrees*; But the most Remarkable, and fit to be distinguished, are three. The first in *Liquours*; The second in *Hard Bodies*: And the third in *Bodies Cleaving* or *Tenacious*. In *Liquours*, this *Appetite* is weake: Wee see in *Liquours*, the *Thredding* of them in *Stillicides*, (as hath beene said;) The *Falling* of them in *Round Drops*, (which is the forme of *Vnion*;) And the *Staying* of them, for a little time, in *Bubbles and Froth*. In the second *Degree* or *Kinde*, this *Appetite* is strong; As in *Iron*, in *Stone*, in *Wood*, &c. In the third, this *Appetite* is in a *Medium* betweene the other two: For such *Bodies* doe partly follow the Touch of another Body; And partly sticke and continue to themselves; And therefore they roape, and draw themselves in Threds; As wee see in *Pitch*, *Glew*, *Birdlime*, &c. But note, that all *Solide Bodies* are *Cleaving*, more or lesse: And that they love better the Touch of somewhat that is *Tangible*, than of *Aire*. For *Water*, in small quantitie, cleaveth to any Thing that is Solide; And so would *Metall* too, if the weight drew it not off. And therefore *Gold Foliate*, or any *Metall Foliate*, cleaveth: But those *Bodies* which are noted to be Clammy, and Cleaving, are such, as have a more indifferent *Appetite* (at once,) to follow another *Body*; And to hold to themselves. And therefore they are commonly *Bodies* ill mixed; And which take more pleasure in a Forraine Body, than in perserving their owne *Consistence*; And which have little

Experiment Solitary touching *Appetite* of *Vnion* in *Bodies*. 293

tle predominance in *Drought*, or *Moisture*.

Experiment Solitary touching the *like Operations* of *Heat*, and *Time*. 294

Time, and *Heat*, are Fellowes in many Effects. *Heat* drieth Bodies, that doe easily expire; As Parchment, Leaves, Roots, Clay, &c. And, so doth *Time* or *Age* arefie; As in the same Bodies, &c. *Heat* dissolveth and melteth Bodies, that keepe in their Spirits; As in divers *Liquefactions*; And so doth *Time*, in some Bodies of a softer Consistence: As is manifest in Honey, which by *Age* waxeth more liquid; And the like in Sugar; And so in old Oyle, which is ever more cleare, and more hot in Medicinable use. *Heat* causeth the Spirits to search some Issue out of the Body; As in the *Volatilitie* of *Metalls*; And so doth *Time*; As in the *Rust* of *Metalls*. But generally *Heat* doth that in small time, which *Age* doth in long.

Experiment Solitary touching the *differing Operations* of *Fire*, and *Time*. 295

SOme Things which passe the *Fire* are softest at first, and by *Time* grow hard; As the Crumme of Bread. Some are harder when they come from the *Fire*, and afterwards give againe, and grow soft, as the Crust of Bread, Bisket, Sweet Meats, Salt, &c. The *Cause* is, for that in those things which waxe Hard with *Time*, the Worke of the *Fire* is a Kinde of *Melting*: And in those that waxe Soft with *Time*, (contrariwise,) the worke of the *Fire* is a Kinde of *Baking*; And whatsoever the *Fire* baketh, *Time* doth in some degree dissolve.

Experiment Solitary touching *Motions* by *Imitation*. 296

Motions passe from one Man to another, not so much by Exciting Imagination; as by Invitation; Especially if there be an Aptnesse or Inclination before. Therefore *Gaping*, or *Yawning*, and *Stretching* doe passe from Man to Man; For that that causeth *Gaping* and *Stretching* is, when the Spirits are a little Heavie, by any Vapour, or the like. For then they strive, (as it were,) to wring out, and expell that which loadeth them. So Men drowzie, and desirous to sleepe; Or before the Fit of an Ague; doe use to Yawne and Stretch; And doe likewise yeeld a *Voice* or *Sound*, which is an *Interjection* of *Expulsion*: So that if another be apt and prepared to doe the like, hee followeth by the Sight of another. So the *Laughing* of another maketh to *Laugh*.

Experiment Solitary, touching *Infectious Diseases*. 297

THere be some knowne *Diseases* that are *Infectious*; And Others that are not. Those that are *Infectious*, are; First, such as are chiefly in the *Spirits*, and not so much in the *Humours*; And therefore passe easily from Body to Body: Such are *Pestilences*, *Lippitudes*, and such like. Secondly, such as *Taint* the *Breath*; Which wee see passeth manifestly from Man to Man; And not invisible, as the *Affects* of the *Spirits* doe: Such are *Consumptions* of the *Lungs*, &c. Thirdly, such as come forth to the *Skinne*; And therefore taint the *Aire*, or the *Body Adjacent*.

Adjacent; Especially if they consist in an Vnctuous Substance, not apt to dissipate; Such are *Scabs*, and *Leprousie*. Fourthly, such as are meerely in the *Humours*, and not in the *Spirits*, *Breath*, or *Exhalations*: And therefore they never infect, but by *Touch* onely; And such a *Touch*, also as commeth within the *Epidermis*; As the Venome of the *French Poxe*; And the *Biting* of a *Mad Dog*.

Most *Powders* grow more Close and Coherent by *Mixture* of *Water*, than by *Mixture* of *Oyle*, though *Oyle* bee the thicker Body; As *Meale*; &c. The Reason is the Congruity of Bodies; which if it bee more, maketh a Perfecter Imbibition, and Incorporation; Which in most *Powders* is more betweene *Them* and *water*, than betweene *Them* and *Oyle*: But *Painters Colours* ground, and *Ashes*, doe better incorporate with *Oyle*.

Experiment Solitary touching the *Incorporation* of *Powders* and *Liquours*. 298

Much *Motion* and *Exercise* is good for some *Bodies*; And *Sitting*, and *lesse Motion* for others. If the Body be Hot, & Void of Superfluous Moistures, too much *Motion* hurteth: And it is an Errour in *Physitians*, to call too much upon *Exercise*. Likewise Men ought to beware, that they use not *Exercise*, and a *Spare Diet* both: But if much *Exercise*, then a *Plentifull Diet*; And if *Sparing Diet*, then little *Exercise*. The *Benefits* that come of *Exercise* are, First, that it sendeth *Nourishment* into the Parts more forcibly. Secondly, that it helpeth to Excerne by *Sweat*, and so maketh the Parts assimilate the more perfectly. Thirdly, that it maketh the *Substance* of the *Body* more *Solide* and *Compact*; And so lesse apt to be Consumed and Depredated by the *Spirits*. The *Evills* that come of *Exercise*, are: First, that it maketh the *Spirits* more Hot and Predatory. Secondly, that it doth absorbe likewise, and attenuate too much the Moisture of the *Body*. Thirdly, that it maketh too great *Concussion*, (especially if it be violent,) of the *Inward Parts*; which delight more in Rest. But generally *Exercise*, if it bee much, is no Friend to *Prolongation* of *Life*; Which is one Cause, why *women* live longer than *Men*, because they stirre lesse.

Experiment Solitary touching *Exercise* of the *Body*. 299

Some *Food* we may use *long*, and *much*, without *Glutting*; As Bread, Flesh that is not fat, or rancke, &c. Some other, (though pleasant,) *Glutteth* sooner; As Sweet Meats, Fat Meats, &c. The *Cause* is, for that *Appetite* consisteth in the Emptinesse of the Mouth of the Stomacke; Or possessing it with somewhat that is Astringent; And therfore Cold and Dry. But things that are *Sweet* and *Fat*, are more Filling: And doe swimme and hang more about the Mouth of the Stomacke; And goe not downe so speedily: And againe turne sooner to *Choler*, which is hot, and ever abateth the Appetite. Wee see also, that another *Cause* of *Saciety*, is an *Over-Custome*; and of *Appetite* is *Novelty*: And therefore *Meats*, if the same be continually taken, induce *Loathing*. To give the Reason of the *Distaste* of *Saciety*, and of the *Plea-*

Experiment Solitary, touching *Meats*, that *induce Saciety*. 300

ſure in *Novelty*; and to diſtinguiſh not onely in Meats and Drinkes, but alſo in Motions, Loves, Company, Delights, Studies, what they be that *Cuſtome* maketh more gratefull; And what more tedious; were a large Field. But for *Meats*, the Cauſe is *Attraction*, which is quicker, and more excited towards that which is new, than towards that whereof there remaineth a Reliſh by former uſe. And (generally) it is a Rule, that whatſoever is ſomewhat Ingrate at firſt, is made Gratefull by *Cuſtome*; But whatſoever is too Pleaſing at firſt, groweth quickly to *ſatiate*.

NATV-

NATVRALL HISTORIE.

IV. Century.

ACCELERATION of *Time*, in *Works* of *Nature*, may well be esteemed *Inter Magnalia Naturæ*. And even in *Divine Miracles*, *Accelerating* of the *Time*, is next to the *Creating* of the *Matter*. Wee will now therefore proceed to the Enquiry of it: And for *Acceleration* of *Germination*, we will referre it over unto the place, where we shall handle the Subject of *Plants*, generally; And will now begin with other *Accelerations*.

Experiments in Consort, touching the *Clarification* of *Liquours*, and the *Accelerating* thereof.

Liquours are (many of them) at the first, thicke and troubled; As *Must*, *Wort*, *Iuyces* of *Fruits*, or *Herbs* expressed, &c. And by *Time* they settle, and Clarifie. But to make them cleare, before the *Time*, is a great Worke; For it is a Spurre to Nature, and putteth her out of her pace: And besides, it is of good use, for making *Drinkes*, and *Sauces*, Potable, and Serviceable, spedily; But to know the *Meanes* of *Accelerating Clarification*, we must first know the *Causes* of *Clarification*. The first *Cause* is, by the *Seperation* of the *Grosser Parts* of the *Liquour*, from the *Finer*. The second, by the *Equall Distribution* of the *Spirits* of the *Liquour*, with the *Tangible Parts*: For that ever representeth Bodies Cleare and Vntroubled. 301

bled. The third, by the *Refining* the *Spirit it selfe*, which thereby giveth to the *Liquour* more Splendour, and more Lustre.

302 First, for *Separation*; It is wrought by *Weight*; As in the ordinary Residence or Settlement of *Liquours*: By *Heat*: By *Motion*: By *Precipitation*, or *Sublimation*; (That is, a Calling of the severall Parts, either up, or downe, which is a kinde of *Attraction*:) By *Adhesion*; As when a Body more *Viscous* is mingled and agitated with the *Liquour*; which Viscous Body (afterwards severed) draweth with it the grosser Parts of the *Liquour*: And Lastly, By *Percolation* or *Passage*.

303 Secondly, for the *Even Distribution* of the *Spirits*; It is wrought By *Gentle Heat*; And By *Agitation* or *Motion*;) For of *Time* we speak not, because it is that, we would anticipate and represent:) And it is wrought also, By *Mixture* of some other *Body*, which hath a vertue to open the *Liquour*, and to make the *Spirits* the better passe thorow.

304 Thirdly, for the *Refining* of the *Spirit*, it is wrought likewise By *Heat*; By *Motion*; And By *Mixture* of some *Body* which hath *Vertue to attenuate*. So therefore (having shewen the *Causes*) for the *Accelerating* of *Clarification*, in generall, and the *Enducing* of it; take these *Instances*, and *Trialls*.

305 It is in common Practice, to draw *Wine*, or *Beere*, from the *Lees*, (which wee call *Racking*;) wherby it will *Clarifie* much the sooner: For the *Lees*, though they keepe the *Drinke* in Heart, and make it lasting; yet withall they cast up some Spissitude: And this *Instance* is to be referred to *Separation*.

306 One the other side; it were good to try, what the Adding to the *Liquour* more *Lees* than his owne will worke; For though the *Lees* doe make the *Liquour* turbide, yet they refine the *Spirits*. Take therefore a Vessell of *New Beere*; And take another Vessell of *New Beere*, and Rack the one Vessell from the *Lees*, and powre the *Lees* of the Racked Vessell into the unracked Vessell, and see the Effect: This *Instance* is referred to the *Refining* of the *Spirits*.

307 Take *New Beere*, and put in some Quantitie of *Stale Beere* into it, and see whether it will not accelerate the *Clarification*, by Opening the Body of the *Beere*, and Cutting the Grosser Parts, wherby they may fall downe into *Lees*. And this *Instance* againe is referred to *Separation*.

308 The longer *Malt*, or *Herbs*, or the like, are Infused in *Liquour*, the more thicke and troubled the *Liquour* is; But the longer they be decocted in the *Liquour*, the clearer it is. The reason is plaine, because in *Infusion*, the longer it is, the greater is the Part of the Grosse Body, that goeth into the *Liquour*: But in *Decoction*, though more goeth forth, yet it either purgeth at the Top, or settleth at the Bottome. And therfore the most Exact Way to *Clarifie* is; First to *Infuse*, and then to take off the *Liquour*, and *Decoct* it; as they doe in *Beere*, which hath *Malt* first Infused in the *Liquour*, and is afterwards boiled with the Hop. This also is referred to *Separation*.

309 Take *Hot Embers*, and put them about a Bottle filled with *New Beere*, almost

almost to the very Neck: Let the Bottle be well stopped, lest it flie out: And continue it, renewing the *Embers* every day, by the space of Ten Dayes; and then compare it with another Bottle of the same *Beere* set by. Take also Lime both *Quenched*, and *Vnquenched*, and set the Bottles in them, *ut suprà*. This *Instance* is refered, both to the *Even Distribution*, and also to the *Refining* of the *Spirits* by *Heat*.

Take *Bottles*, and *Swing* them; Or *Carry* them in a *Wheele-Barrow*, upon *Rough Ground*; twice in a day: But then you may not fill the *Bottles* full, but leave some Aire; For if the *Liquour* come close to the Stopple, it cannot play, nor flower: And when you have shaken them well, either way, poure the *Drinke* into another Bottle, stopped close, after the usuall manner; For if it stay with much Aire in it, the *Drinke* will pall, neither will it settle so perfectly in all the Parts. Let it stand some 24. houres: Then take it, and and put it againe into a *Bottle* with *Aire, ut suprà*: And thence into a *Bottle Stopped ut suprà*: And so repeat the same *Operation* for seven dayes. Note that in the Emptying of one Bottle into another, you must doe it swiftly, lest the *Drinke* pall. It were good also, to trie it in a *Bottle* with a little Aire below the Neck, without Emptying. This *Instance* is referred to the *Even Distribution* and *Refining* of the *Spirits* by *Motion*.

As for *Percolation*, *Inward*, and *Outward*, (which belongeth to *Separation*,) Triall would be made, of *Clarifying* by *Adhesion*, with *Milke* put into *New-Beere*, and stirred with it: For it may be that the Grosser Part of the *Beere* will cleave to the *Milke*: The Doubt is, whether the *Milke* will sever well againe; Which is soone tried. And it is usuall in *Clarifying Ippocrasse* to put in *Milke*; Which after severeth and carrieth with it the *Grosser Parts* of the *Ippocrasse*, as hath beene said elsewhere. Also for the better *Clarification* by *Percolation*, when they tun *New Beere*, they use to let it passe through a *Strainer*; And it is like the finer the *Strainer* is, the clearer it will be.

Experiments in Consort touching *Maturation*, and the *Accelerating* thereof. And first touching the *Maturation* and *Quickning* of *Drinks*. And next touching the *Maturation* of *Fruits*.

The *Accelerating* of *Maturation* wee will now enquire of. And of *Maturation* it selfe. It is of three Natures. The *Maturation* of *Fruits*: The *Maturation* of *Drinkes*: And the *Maturation* of *Impostumes*, and *Vlcers*. This last we referre to another Place, where wee shall handle *Experiments Medicinall*. There be also other *Maturations*, as of *Metalls*, &c. whereof wee will speake as Occasion serveth. But we will begin with that of *Drinkes*, because it hath such Affinitie with the *Clarification* of *Liquours*.

For the *Maturation* of *Drinkes*, it is wrought by the *Congregation* of the *Spirits* together, whereby they digest more perfectly the Grosser Parts: And it is effected partly, by the same means, that *Clarification* is, (whereof wee spake before;) But then note, that an Extreme *Clarification* doth

ſpread the *Spirits* ſo Smooth, as they become Dull, & the *Drinke* dead, which ought to have a little Flouring. And therefore all your Cleare *Amber Drinke* is flat.

313 We ſee the *Degrees* of *Maturation* of *Drinkes*; In *Muſt*; In *Wine*, as it is drunke; And in *Vinegar*. Whereof *Muſt* hath not the *Spirits* well Congregated; *Wine* hath them well united; ſo as they make the Parts ſomewhat more Oylie: *Vinegar* hath them Congregated, but more Jejune, and in ſmaller Quantitie; The greateſt and fineſt Spirit and Part being exhaled: For we ſee *Vinegar* is made by ſetting the Veſſell of *Wine* againſt the hot Sun: And therefore *Vinegar* will not burne; For that much of the Finer Parts is Exhaled.

314 The *Refreſhing* and *Quickning* of *Drinke* Palled, or Dead, is by *Enforcing* the *Motion* of the *Spirit*: So wee ſee that *Open Weather* relaxeth the *Spirit*, and maketh it more lively in *Motion*. Wee ſee alſo *Bottling* of *Beere*, or *Ale*, while it is New, and full of *Spirit*, (ſo that it ſpirteth when the Stopple is taken forth) maketh the *Drinke* more quicke and windie. A *Pan* of *Coales* in the *Cellar* doth likewiſe good, and maketh the *Drinke* worke againe. *New Drinke*, put to *Drinke* that is *Dead*, provoketh it to worke againe: Nay, which is more, (as ſome affirme,) *A Brewing of New Beere*, ſet by *Old Beere*, maketh it worke againe. It were good alſo to *Enforce* the *Spirits* by ſome *Mixtures*, that may excite and quicken them; As by putting into the *Bottles*, *Nitre*, *Chalke*, *Lime*, &c. We ſee *Creame* is *Matured*, and made to riſe more ſpeedily, by Putting in *Cold Water*; which, as it ſeemeth, getteth downe the *Whey*.

315 It is tried, that the *Burying* of *Bottles of Drinke* well ſtopped, either in *drie Earth*, a good depth; Or in the *Bottome* of a *well within Water*; And beſt of all the *Hanging* of them in a *deepe Well* ſomewhat *above the water*, for ſome forthnights ſpace, is an Excellent *Meanes* of making *Drink* freſh, and quicke: for the *Cold* doth not cauſe any Exhaling of the *Spirits* at all; As *Heat* doth, though it rarifieth the reſt that remaine: But *Cold* maketh the *Spirits* vigorous, and irritateth them, whereby they incorporate the Parts of the *Liquour* perfectly.

316 As for the *Maturation of Fruits*; It is wrought by the *Calling forth of the Spirits of the Body outward*, and ſo *Spreading* them more *ſmoothly*: And likewiſe by *Digeſting*, in ſome degree, *the Groſſer Parts*: And this is Effected, by *Heat*; *Motion*; *Attraction*; And by a *Rudiment* of *Putrefaction*: For the Inception of *Putrefaction* hath in it a *Maturation*.

317 There were taken *Apples*, and laid in *Straw*; In *Hay*; In *Flower*; In *Chalke*; In *Lime*; Covered over with *Onions*; Covered over with *Crabs*; Cloſed up in *Wax*; Shut in a *Box*: &c. There was alſo an *Apple* hanged up in *Smoake*: Of all which the *Experiment* ſorted in this Manner.

318 After a Moneths Space, the *Apple* Encloſed in *Wax*, was as Greene and Freſh as at the firſt Putting in, and the *Kernells* continued White. The *Cauſe* is, for that all *Excluſion* of *Open Aire*, (which is ever Predatory) maintaineth the Body in his firſt Freſhneſſe, and Moiſture: But the Inconvenience

convenience is, that it tasteth a little of the *Wax*: Which, I suppose, in a *Pomgranate*, or some such thick-coated *Fruit*, it would not doe.

319 The *Apple* Hanged in the *Smoake*, turned like an Old Mellow *Apple*, Wrinkled, Drie, Soft, Sweet, Yellow within. The *Cause* is, for that such a degree of *Heat*, which doth neither Melt, nor Scorch, (For we see that in a greater *Heat*, a *Roast Apple* Softneth and Melteth; And *Pigs-feet*, made of Quarters of *Wardens*, scorch and have a Skinne of Cole) doth Mellow, and not Adure: The *Smoake* also maketh the *Apple* (as it were) sprinkled with *Soot*, which helpeth to *Mature*. We see that in *Drying* of *Peares*, and *Prunes*, in the Oven, and Removing of them often as they begin to Sweat, there is a like Operation; But that is with a farre more Intense degree of *Heat*.

320 The *Apples* covered in the *Lime* and *Ashes*, were well *Matured*; As appeared both in their Yellownesse, and Sweetnesse. The *Cause* is, for that that *Degree of Heat* which is in *Lime*, and *Ashes*, (being a Smoothering *Heat*) is of all the rest most Proper; for it doth neither Liquefie, nor Arefie; And that is true *Maturation*. Note that the Taste of those *Apples* was good; And therefore it is the *Experiment* fittest for Use.

321 The *Apples*, *Covered* with *Crabs*, and *Onions*, were likewise well *Matured*. The Cause is, not any *Heat*; But for that the *Crabs* and the *Onions* draw forth the *Spirits* of the *Apple*, and spread them equally thorowout the *Body*; which taketh away Hardnesse. So we see one *Apple* ripeneth against another. And therefore in making of *Cider*, they turne the *Apples* first upon a heape. So one *Cluster* of *Grapes*, that toucheth another whilest it groweth, ripeneth faster; *Botrus contra Botrum citiùs matureſcit*.

322 The *Apples* in *Hay*, and the *Straw*, ripened apparently, though not so much as the Other; But the *Apple* in the *Straw* more. The *Cause* is, for that the *Hay* and *Straw* have a very low degree of *Heat*, but yet Close and Smoothering, and which drieth not.

323 The *Apple* in the *Close Box*, was ripened also: The *Cause* is, for that all Aire, kept close, hath a degree of *warmth*: As we see in *Wooll*, *Furre*, *Plush*, &c.

Note that all these were Compared with another Apple, *of the same kinde, that lay of it selfe: And in Comparison of that, were more Sweet, and more Yellow, and so appeared to be more Ripe.*

324 Take an *Apple*, or *Peare*, or other like *Fruit*, and *Rowle* it upon a Table hard: Wee see in Common Experience, that the *Rowling* doth Soften and Sweeten the *Fruit* presently; Which is Nothing but the *Smooth Distribution* of the *Spirits* into the Parts: For the *Vnequall Distribution* of the *Spirits* maketh the Harrishnesse: But this Hard *Rowling* is betweene *Concoction*, and a *Simple Maturation*; Therefore, if you should *Rowle* them but gently, perhaps twice a day; And continue it some seven dayes, it is like they would *mature* more finely, and like unto the *Naturall Maturation*.

325 Take an *Apple*, and cut out a Peece of the Top, and cover it, to see whether that *Solution of Continuitie* will not hasten a *Maturation*: We see that

that where a *Waspe*, or a *Flie*, or a *Worme* hath bitten, in a *Grape*, or any *Fruit*, it will sweeten hastily.

326 Take an *Apple*, &c. and pricke it with a *Pinne* full of *Holes*, not deepe, and smeare it a little with *Sacke*, or *Cinnamon Water*, or *Spirit of Wine*, every day for ten dayes, to see if the *Virtuall Heat* of the *Wine*, or *Strong Waters*, will not *Mature* it.

In these Trialls *also, as was used in the first, set another of the same* Fruits *by, to Compare them: And trie them, by their* Yellownesse, *and by their* Sweetnesse.

Experiment Solitary, touching the *Making* of *Gold*.

The World hath beene much abused by the Opinion of *Making of Gold*: The *Worke* it selfe I judge to be possible; But the *Meanes* (hitherto propounded) to effect it, are, in the Practice, full of Errour and Imposture; And in the Theory, full of unsound Imaginations. For to say, that *Nature* hath an Intention to make all Metals *Gold*; And that, if she were delivered from Impediments, she would performe her owne Worke; And that, if the Crudities, Impurities, and Leprosities of *Metals* were cured, they would become *Gold*; And that a little *Quantitie* of the *Medicine*, in the Worke of *Projection*, will turne a Sea of the *Baser Metall* into *Gold*, by *Multiplying*: All these are but dreames: And so are many other Grounds of *Alchymy*. And to helpe the Matter, the *Alchymists* call in likewise many Vanities, out of *Astrologie*; *Naturall Magicke*; Superstitious Interpretations of *Scriptures*; Auticular *Traditions*; Faigned Testimonies of *Ancient Authors*; And the like. It is true, on the other side, they have brought to light not a few profitable *Experiments*, and thereby made the World some amends. But wee, when wee shall come to handle the *Version* and *Transmutation* of *Bodies*; And the *Experiments* concerning *Metalls*, and *Mineralls*; will lay open the true Wayes and Passages of *Nature*, which may leade to this great Effect. And wee commend the wit of the *Chineses*, who despaire of Making of *Gold*, but are Mad upon the Making of *Silver*: For certain it is, that it is more difficult to make *Gold*, (which is the most Ponderous and Materiate amongst *Metalls*) of other *Metalls*, lesse Ponderous, and lesse Materiate; than (*viâ versâ*) to make *Silver* of *Lead*, or *Quick-Silver*; Both which are more Ponderous than *Silver*; So that they need

need rather a further Degree of *Fixation*, than any *Condenſation*. In the meane time, by Occaſion of Handling the *Axiomes* touching *Maturation*, wee will direct a *Triall* touching the *Maturing* of *Metalls*, and thereby Turning ſome of them into *Gold*: For we conceive indeed, that a perfect good *Concoction*, or *Diſgeſtion*, or *Maturation* of ſome *Metalls*, will produce *Gold*. And here we call to minde, that we knew a *Dutch-man*, that had wrought himſelfe into the beleefe of a great Perſon, by undertaking that he could make *Gold*: Whoſe diſcourſe was, that *Gold* might be made; But that the *Alchymiſts* Over-fired the Worke: For (he ſaid) the *Making* of *Gold* did require a very temperate *Heat*, as being in *Nature* a Subterrany worke, where little *Heat* commeth; But yet more to the *Making* of *Gold*, than of any other *Metall*; And therefore, that he would doe it with a great Lamp, that ſhould carry a Temperate and Equall Heat: And that it was the Worke of many Moneths. The Device of the Lampe was folly; But the Over-firing now uſed; And the Equall Heat to be required; And the Making it a Worke of ſome good Time; are no ill Diſcourſes.

We reſort therefore to our *Axiomes* of *Maturation*, in Effect touched before. The Firſt is, that there be *uſed a Temperate Heat*; For they are ever *Temperate Heats* that *Diſgeſt*, and *Mature*: Wherein we meane *Temperate*, according to the *Nature* of the *Subject*; For that may be *Temperate* to *Fruits*, and *Liquours*, which will not worke at all upon *Metalls*. The Second is, that the *Spirit of the Metall be quickened*, and the *Tangible Parts opened*: For without thoſe two Operations, the *Spirit* of the *Metall*, wrought upon, will not be able to diſgeſt the Parts. The Third is, that the *Spirits doe ſpread themſelves Even*, and *move not Subſultorily*; For that will make the Parts Cloſe, and Pliant. And this requireth a Heat, that doth not riſe and fall, but continue as *Equall* as may be. The Fourth is, that *no Part of the Spirit be emitted, but detained*: For if there be *Emiſſion* of *Spirit*, the Body of the *Metall* will be Hard, and Churliſh. And this will be performed, partly by the Temper of the Fire; And partly by the cloſeneſſe of the Veſſell. The

Fifth

Fifth is, that there be *Choice made of the likelieſt and beſt Prepared Metall, for the Verſion:* For that will facilitate the Worke. The Sixth is, that you give *Time enough for the Worke:* Not to prolong Hopes (as the Alchymiſts doe;) but indeed to give *Nature* a convenient Space to worke in. Theſe Principles are moſt certaine, and true; Wee will now derive a direction of *Triall* out of them; Which may (perhaps) by further Meditation, be improved.

327 Let there be a *Small Furnace* made, of a *Temperate Heat*; Let the *Heat* be ſuch, as may keepe the *Metall perpetually Moulten*, and no more; For that above all importeth to the Worke. For the Materiall, take *Silver*, which is the *Metall* that in Nature Symbolizeth moſt with *Gold*; Put in alſo, with the *Silver*, a Tenth Part of *Quick-ſilver*, and a Twelfth Part of *Nitre*, by weight; Both theſe to quicken and open the Body of the *Metall:* And ſo let the Worke be continued by the *Space of Six Moneths*, at the leaſt. I wiſh alſo, that there be, at ſome times, an Injection of ſome *Oyled* Subſtance; Such as they uſe in the Recovering of *Gold*, which by Vexing with Separations hath beene made Churliſh: And this is, to lay the Parts more Cloſe and Smooth, which is the Maine Worke. For *Gold* (as we ſee) is the Cloſeſt (and therefore the Heavieſt) of *Metalls:* And is likewiſe the moſt Flexible, and Tenſible. Note, that to thinke to make *Gold* of *Quick-ſilver*, becauſe it is the heavieſt, is a Thing not to be hoped; For *Quick-ſilver* will not endure the Mannage of the *Fire*. Next to *Silver*, I thinke *Copper* were fitteſt to be the *Materiall*.

Experiment Solitary touching the *Nature* of *Gold*.

328 *Gold* hath theſe *Natures: Greatneſſe of Weight*; *Cloſeneſſe of Parts*; *Fixation*; *Pliantneſſe*, or *Softneſſe*; *Immunitie from Ruſt*; *Colour* or *Tincture of Yellow*. Therefore the Sure Way, (though moſt about,) to make *Gold*, is to know the *Cauſes* of the Severall *Natures* before rehearſed, and the *Axiomes* concerning the ſame. For if a Man can make a *Metall*, that hath all theſe *Properties*, Let Men diſpute, whether it be *Gold*, or no?

Experiments in Conſort touching the *Enducing* and *Accelerating* of *Putrefaction*.

The *Enducing* and *Accelerating* of *Putrefaction*, is a Subject of a very Univerſall Enquiry: For *Corruption* is a Reciprocall to *Generation:* And they Two, are as *Natures* two *Termes* or *Bundaries*; And the *Guides* to *Life* and *Death*. *Putrefaction* is the Worke of the *Spirits* of *Bodies*, which ever are Unquiet to *Get forth*, and *Congregate* with the *Aire*, and to enjoy the *Sunbeames*. The *Getting forth*, or Spreading of the *Spirits*, (which is a Degree of *Getting forth*,) hath five Differing *Operations*. If the

the *Spirits* be detained within the Body, and move more violently, there followeth *Colliquation*; As in *Metalls*, &c. If more Mildely, there followeth *Diſgeſtion*, or *Maturation*; As in *Drinkes*, and *Fruits*. If the *Spirits* be not meerely Detained, but Protrude a little, and that Motion be Confuſed, and Inordinate, there followeth *Putrefaction*; Which ever diſſolveth the Conſiſtence of the Body into much Inequalitie; As in *Fleſh*, *Rotten Fruits*, *Shining Wood*, &c. And alſo in the *Ruſt* of *Metalls*. But if that Motion be in a certaine Order, there followeth *Vivification*, and *Figuration*; As both in *Living Creatures* bred of *Putrefaction*, and in *Living Creatures Perfect*. But if the *Spirits* iſſue out of the Body, there followeth *Deſiccation*, *Induration*, *Conſumption*, &c. As in *Bricke*, evaporation of *Bodies Liquid*, &c.

The *Meanes* to *Enduce* and *Accelerate Putrefaction*, are; Firſt by *Adding ſome Crude or Watry Moiſture*; As in Wetting of any Fleſh, Fruit, Wood, with *Water*, &c. For contrariwiſe *Vnctuous* and *Oyly Subſtances* preſerve. 329

The Second is by *Invitation* or *Excitation*; As when a *Rotten Apple* lyeth cloſe to another *Apple* that is *Sound*: Or when *Dung* (which is a Subſtance already Putrified) is added to other Bodies. And this is alſo notably ſeene in *Church-yards*, where they bury much; Where the Earth will conſume the *Corps*, in farre ſhorter time, than other Earth will. 330

The Third is, by *Cloſeneſſe*, and *Stopping*, which *detaineth* the *Spirits*, *in Priſon*, more than they would; And thereby irritateth them to ſeeke Iſſue; As in Corne, and Cloaths, which wax Muſty; and therefore Open Aire (which they call *Aer perflabilis*) doth preſerve: And this doth appeare more Evidently in *Agues*, which come (moſt of them) of *Obſtructions*, and *Penning* the *Humours*, which thereupon *Putrifie*. 331

The Fourth is, by *Solution of Continuitie*; As we ſee an Apple will rot ſooner, if it be Cut or Pierced; And ſo will Wood, &c. And ſo the Fleſh of Creatures alive, where they have received any Wound. 332

The Fifth is, either by the *Exhaling*, or by the *Driving back* of the *Principall Spirits*, which preſerve the Conſiſtence of the *Body*; So that when their Government is diſſolved, every *Part* returneth to his Nature, or Homogeny. And this appeareth in *Vrine*, and *Bloud*, when they coole, and thereby breake; It appeareth alſo in the *Gangrene*, or *Mortification* of *Fleſh*, either by *Opiates*, or by *Intenſe Colds*. I conceive alſo the ſame Effect is in *Peſtilences*, for that the *Malignitie* of the *Inficting Vapour*, daunceth the *Principall Spirits*, and maketh them flie, and leave their *Regiment*; And then the *Humours*, *Fleſh*, and *Secondary Spirits*, doe diſſolve, and breake, as in an *Anarchy*. 333

The

334 The Sixth is, when a *Forraine Spirit, Stronger and more Eager than the Spirit of the Body, entreth the Body*; As in the Stinging of Serpents. And this is the *Cause* (generally) that upon all *Poysons* followeth *Swelling*: And we see *Swelling* followeth also, when the *Spirits* of the *Body* it selfe, Congregate too much; As upon *Blowes*, and *Bruises*; Or when they are *Pent in too much*, as in *Swelling* upon *Cold*. And we see also, that the *Spirits* comming of *Putrefaction* of *Humours* in *Agues*, &c. Which may be counted as *Forraine Spirits*, though they be bred within the Body, doe Extinguish and Suffocate the *Naturall Spirits*, and *Heat*.

335 The Seventh is, by such a *Weake Degree of Heat, as setteth the Spirits in a little Motion, but is not able, either to digest the Parts, or to Issue the Spirits*; As is seene in Flesh kept in a Roome that is not Coole; Whereas in a Coole and Wet Larder it will keepe longer. And wee see, that *Vivification* (whereof *Putrefaction* is the *Bastard Brother*,) is effected by such Soft Heats; As the Hatching of Egges; The Heat of the Wombe, &c.

336 The Eight is, by the *Releasing of the Spirits*; which before were close kept by the Solidnesse of their Coverture, and thereby their Appetite of Issuing checked; As in the *Artificiall Rusts* induced by strong Waters, in *Iron, Lead*, &c. And therefore *Wetting* hasteneth *Rust*, or *Putrefaction* of any thing, because it softeneth the Crust, for the *Spirits* to come forth.

337 The Ninth is, by the *Enterchange of Heat and Cold*, or *Wet and dry*; As wee see in the Mouldring of Earth in Frosts, and Sunne; And in the more hasty Rotting of Wood, that is sometimes wet, sometimes dry.

338 The Tenth is, by *Time, and the Worke and Procedure of the Spirits themselves*, which cannot keepe their Station; Especially if they be left to themselves; And there be not Agitation or Locall Motion. As wee see in Corne not stirred; And Mens Bodies not exercised.

339 All *Moulds* are Inceptions of *Putrefaction*; As the *Moulds* of *Pyes*, and *Flesh*; the *Moulds* of *Orenges*, and *Limons*; which *Moulds* afterwards turne into Wormes, or more odious *Putrefactions*: And therefore (commonly) prove to be of ill Odour. And if the Body be Liquid, and not apt to putrifie totally, it will cast up a *Mother* in the Top; As the *Mothers* of *Distilled waters*.

340 *Mosse* is a Kinde of *Mould*, of the Earth, and Trees. But it may be better sorted as a *Rudiment* of *Germination*; To which we referre it.

Experiments in Consort, touching *Prohibiting* and *Preventing Putrefaction*.

It is an *Enquiry* of Excellent use, to Enquire of the *Meanes* of *Preventing* or *Staying Putrefaction*; For therein consisteth the *Meanes* of *Conservation* of *Bodies*; For *Bodies* have two Kindes of *Dissolutions*; The one by *Consumption*, and *Deseccation*; The other by *Putrefaction*. But as for the *Putrefactions* of

of the *Bodies* of *Men*, and *Living Creatures*, (as in Agues, Wormes, Consumptions of the Lungs, Impostumes, and Ulcers both Inwards and Outwards,) they are a great *Part of Physicke*, and *Surgery*: And therefore we will reserve the *Enquiry* of them to the proper Place, where we shall handle *Medicinall Experiments* of all Sorts. Of the rest we will now Enter into an Enquiry: wherein much light may be taken, from that which hath beene said, of the *Meanes* to *Enduce* or *Accelerate Putrefaction*: For the Removing that, which caused *Putrefaction*, doth Prevent and Avoid *Putrefaction*.

The First *Meanes* of *Prohibiting* or *Checking Putrefaction*, is *Cold*: For so wee see that Meat and Drinke will last longer, Vnputrified, or Vnsowred, in Winter, than in Summer: And we see that Flowers, and Fruits, put in Conservatories of Snow, keepe fresh. And this worketh by the *Detention* of the *Spirits*, and *Constipation* of the *Tangible Parts*. 341

The Second is *Astriction*: For *Astriction* prohibiteth *Dissolution*: As we see (generally) in *Medicines*, whereof such as are *Astringents* doe inhibite *Putrefaction*: And by the same reason of *Astringency*, some small Quantitie of Oile of Vitriol, will keepe Fresh Water long from *Putrefying*. And this *Astriction* is in a Substance that hath a *Virtuall Cold*; And it worketh (partly) by the same Meanes that Cold doth. 342

The Third is, the Excluding of the *Aire*; And againe, the *Exposing to the Aire*: For these Contraries, (as it commeth often to passe,) worke the same Effect, according to the Nature of the Subject Matter. So we see, that *Beere*, or *Wine*, in Bottles close stopped, last long; That the *Garners vnder Ground* keepe Corne longer than those above Ground; And that *Fruit closed in Wax* keepeth fresh: And likewise *Bodies* put in *Honey*, and *Flower*, keepe more fresh: And *Liquours*, *Drinkes*, and *Iuices*, with a little *Oyle* cast on the Top, keepe fresh. Contrariwise, we see that *Cloth* and *Apparell*, not *Aired*, doe breed Moathes, and Mould; And the Diversitie is, that in *Bodies* that need *Detention* of *Spirits*, the *Exclusion of the Aire* doth good; As in *Drinkes*, and *Corne*: But in *Bodies* that need *Emission* of *Spirits*, to discharge some of the Superfluous Moisture, it doth hurt, for they require *Airing*. 343

The fourth is *Motion*, and *Stirring*; For *Putrefaction* asketh *Rest*; For the Subtill *Motion*, which *Putrefaction* requireth, is disturbed by any *Agitation*; And all *Locall Motion* keepeth *Bodies* Integrall, and their Parts together; As we see that Turning over of Corne in a Garner, Or Letting it runne like an Houre-glasse, from an upper Roome into a Lower, doth keepe it Sweet: And Running Waters putrefie not: And in Mens Bodies, Exercise hindreth *Putrefaction*; And contrariwise *Rest*, and Want of *Motion*, or Stoppings, (whereby the Runne of Humours, or the Motion of Perspiration, is stayed,) further *Putrefaction*; As we partly touched a little before. 344

345 The Fifth is, the *Breathing forth of the Adventitious Moisture in Bodies*; For as *Wetting* doth hasten *Putrefaction*; So *Convenient Drying*, (whereby the more *Radicall Moisture* is onely kept in,) putteth backe *Putrefaction*: So we see that *Herbs*, and *Flowers*, if they be dried in the Shade; Or dried in the hot Sunne, for a small time, keepe best. For the *Emission* of the *Loose* and *Adventitious Moisture*, doth betray the *Radicall Moisture*; And carryeth it out for Company.

346 The Sixth is, the *Strengthening of the Spirits of Bodies*; For as a *Great Heat* keepeth Bodies from *Putrefaction*; But a *Tepide Heat* enclineth them to *Putrefaction*: So a Strong *Spirit* likewise preserveth, and a Weake or Faint *Spirit* disposeth to *Corruption*. So we finde that Salt-water corrupteth not so soone as Fresh: And Salting of Oysters, and Powdring of Meat, keepeth them from *Putrefaction*. It would be tried also, whether *Chalke* put into *Water*, or *Drinke*, doth not preserve it from *Putrefying*, or speedy Souring. So wee see that *Strong Beere* will last longer than Small; And all Things, that are Hot and Aromaticall, doe helpe to Preserve Liquours, or Powders, &c. Which they doe, as well by Strengthning the *Spirits*, as by Soaking out the loose *Moisture*.

347 The Seventh is, *Separation of the Cruder Parts*, and thereby *making the Body more Equall*; for all unperfect Mixture is apt to *Putrefie*; And Watry Substances are more apt to *Putrefie*, than Oyly. So we see Distilled Waters will last longer, than Raw waters; And Things that have passed the Fire, doe last longer, than those that have not passed the Fire; As Dried Peares, &c.

348 The Eighth is, the *Drawing forth continually of that part, where the Putrefaction beginneth*: Which is (commonly) the *Loose and watry Moisture*; Not onely for the Reason before given, that it provoketh the *Radicall Moisture* to come forth with it; But because being detained in the Body, the *Putrefaction* taking hold of it, infecteth the rest: As we see in the *Embalming dead Bodies*: And the same Reason is of *Preserving Herbs*, or *Fruits*, or *Flowers*, in *Branne*, or *Meale*.

349 The Ninth is, the *Commixture of any Thing that is more Oily*, or *Sweet*: For such *Bodies* are least apt to *Putrefie*, the *Aire* working little upon them; And they not putrefying preserve the rest. And therefore we see *Syrrups*, and *Ointments*, will last longer, than *Iuyces*.

350 The Tenth is, the *Commixture of somewhat that is Dry*; For *Putrefaction* beginneth first from the *Spirits*; And then from the *Moisture*: And that that is dry is unapt to putrefie: And therefore Smoake preserveth Flesh; As wee see in Bacon, and Neats-Tongues, and Martlemas Beefe, &c.

351 The Opinion of some of the *Ancients*, that *Blowne Aires* doe preserve Bodies, longer than other *Aires*, seemeth to Mee Probable; For that the *Blowne Aires*, being Over-charged and Compressed, will hardly receive the Exhaling of any Thing, but rather repulse it. It was tried in a *Blowne Bladder*, whereinto Flesh was put, and likewise a Flower, and it sorted not: For *Dry Bladders* will not *Blow*: And *New Bladders* rather

ther further *Putrefaction:* The way were therefore, to blow ſtrongly, with a Paire of Bellowes, into a Hogſhead, putting into the Hogſhead (before) that which you would have preſerved; And in the inſtant that you withdraw the Bellowes, ſtop the Hole cloſe.

Experiment Solitary touching *Wood Shining* in the *Darke.* 352

THe *Experiment* of *Wood* that *Shineth* in the *Darke*, we have diligently driven, and purſued: The rather, for that of all Things, that give Light here below, it is the moſt Durable; And hath leaſt Apparent Motion. *Fire* and *Flame* are in continuall Expence; *Sugar* ſhineth onely while it is in Scraping; And *Salt-water* while it is in Daſhing; *Glow-wormes* have their Shining while they live, or a little after; Onely *Scales* of *Fiſhes* (Putrified) ſeeme to be of the ſame Nature with *Shining Wood*: And it is true, that all *Putrefaction* hath with it an Inward Motion, as well as *Fire*, or *Light*. The *Triall* ſorted thus. 1. The *Shining* is in ſome Peeces more *Bright*, in ſome more *Dimme*; but the moſt *Bright* of all doth not attaine to the Light of a *Glow-worme*. 2. The *Woods* that have beene tried to ſhine, are chiefly *Sallow*, and *Willow*; Alſo the *Aſh*, and *Haſle*; It may be, it holdeth in others. 3. Both *Roots*, and *Bodies* doe ſhine, but the *Roots* better. 4. The *Colour* of the *Shining Part*, by Day-light, is in ſome Peeces *White*, in ſome Peeces inclining to *Red*; Which in the Countrey they call the *white*, and *Red Garret*. 5. The Part that ſhineth, is, (for the moſt part) ſomewhat *Soft*, and *Moiſt* to feele to; But ſome was found to be *Firme* and *Hard*; So as it might be figured into a Croſſe, or into Beads, &c. But you muſt not looke to have an Image, or the like, in any Thing that is Lightſome; For even a face in Iron red Hot will not be ſeene, the Light confounding the ſmall differences of Lightſome and Darkſome, which ſhew the figure. 6. There was the *Shining Part pared off*, till you came to that, that did not Shine; But within two Dayes the *Part Contiguous* began alſo to *Shine*, being laid abroad in the Dew; So as it ſeemeth the Putrefaction ſpreadeth. 7. There was other dead *Wood* of like kind, that was *Laid abroad*, which *Shined* not at the firſt: But after a Nights lying abroad began to *Shine*. 8. There was other *Wood*, that did *Firſt Shine*; And being laid dry in the Houſe, within five or ſix dayes, *Loſt* the *Shining*; And laid abroad againe, *Recovered* the *Shining*. 9. *Shining Woods*, being laid in a *Dry Roome*, within a Seven night, loſt their Shining; But being laid in a *Cellar*, or *Danke Roome*, kept the *Shining*. 10. The *Boring of Holes*, in that kinde of Wood, and then laying it abroad, ſeemeth to conduce to make it *Shine*: The *Cauſe* is, for that all *Solution* of *Continuitie* doth helpe on *Putrefaction*, as was touched before. 11. No *Wood* hath beene yet tryed to *Shine*, that was cut *downe alive*, but ſuch as was *Rotted*, both in Stocke, and Root, while it grew. 12. Part of the *Wood* that *Shined*, was *ſteeped in Oyle*, and retained the *Shining* a Fortnight. 13. The like ſucceeded in ſome *Steeped* in *Water*, and much better. 14. How long the *Shining* will continue, if the *Wood* be *laid abroad every Night*, and *taken in* and *Sprinkled* with *Water* in the *Day*, is not yet tryed. 15. Triall was

made of *laying it abroad in Frostie weather*, which hurt it not. 16. There was a great *Peece* of a *Root* which did shine, and the *Shining Part* was *Cut off*, till no more Shined; Yet after two Nights, though it were kept in a drie Roome, it got a *Shining*.

Experiment Solitary touching the *Acceleratio* of *Birth*. 353

THe *Bringing forth* of *living Creatures* may be *accelerated* in two Respects: The one, if the *Embryon ripeneth* and perfecteth sooner: The other, if there be some Cause from the *Mothers Body*, of *Expulsion* or Putting it downe: whereof the Former is good, and argueth Strength; The Latter is ill, and commeth by Accident or Disease. And therefore the Ancient *Observation* is true, that the *Childe borne in the Seventh Moneth*, doth commonly well; But *Borne in the Eighth Moneth*, doth (for the most part) die. But the *Cause* assigned is Fabulous; Which is, that in the Eighth Moneth, should be the Returne of the Raigne, of the *Planet Saturne*: which (as they say) is a *Planet* Maligne; whereas in the Seventh is the Raigne of the *Moone*, which is a Planet Propitious. But the true *Cause* is, for that where there is so great a Prevention of the Ordinary time, it is the *lustinesse* of the *Childe*; But when it is lesse, it is some *Indisposition* of the *Mother*.

Experiment Solitary touching the *Acceleration* of *growth* and *Stature*. 354

TO *Accelerate Growth* or *Stature*, it must proceed; Either from the *Plentie* of the *Nourishment*; Or from the *Nature* of the *Nourishment*; Or from the *Quickening* and *Exciting* of the *Naturall Heat*. For the first, *Excesse* of *Nourishment* is hurtfull; For it maketh the Childe Corpulent; And Growing in Breadth, rather than in Heigth. And you may take an Experiment from *Plants*, which, if they spread much, are seldome tall. As for the *Nature* of the *Nourishment*; First, it may not be too *Drie*; And therefore Children in Dayrie Countries doe wax more tall, than where they feed more upon Bread, and Flesh. There is also a received Tale; That Boyling of *Dasie Roots* in *Milke* (which it is certaine are great Driers) will make *Dogs* little. But so much is true, that an *Over-drie Nourishment* in Child-hood puttreth backe Stature. Secondly, the *Nourishment* must be of an *Opening Nature*; For that Attenuateth the Juice, and furthereth the Motion of the Spirits, upwards. Neither is it without cause, that *Xenophon*, in the *Nouriture* of the *Persian Children*, doth so much commend their Feeding upon *Cardamon*; which (he saith) made them grow better, and be of a more Active Habit. *Cardamon* is in Latine *Nasturtium*; And with us *Water-Cresses*; Which, it is certaine, is an Herbe, that whilest it is young, is Friendly to Life. As for the *Quickening* of *Naturall Heat*, it must be done chiefly with *Exercise*; And therefore (no doubt) much Going to Schoole, where they sit so much, hindreth the *Growth* of *Children*; whereas Countrey People, that goe not to Schoole, are commonly of better Stature. And againe Men must beware, how they give *Children*, any thing that is *Cold* in Operation; For even *Long Sucking* doth hinder both *Wit*, and *Stature*. This hath beene tryed, that a Whelpe, that hath beene fed with *Nitre* in *Milke*, hath become

come very little, but extreme lively: For the *Spirit* of *Nitre* is *Cold*. And though it be an Excellent Medicine, in Strength of yeares, for Prolongation of Life; yet it is, in Children and young Creatures, an Enemy to *Growth*: And all for the same Reason; For *Heat* is requisite to Growth: But after a Man is come to his Middle Age, *Heat* consumeth the Spirits; which the Coldnesse of the Spirit of *Nitre* doth helpe to condense, and correct.

Experiments in Consort touching *Sulphur* and *Mercury*, two of *Paracelsus* Principles.

There be two *Great Families* of *Things*; You may terme them by severall Names; *Sulphureous* and *Mercuriall*, which are the *Chymists* Words: (For as for their *Sal*, which is their Third Principle, it is a Compound of the other two;) *Inflammable* and *Not Inflammable*; *Mature* and *Crude*; *Oily* and *Watry*. For we see that in *Subterranies* there are, as the *Fathers* of their *Tribes*, *Brimstone* and *Mercury*: In *Vegetables*, and *Living Creatures* there is *Water* and *Oile*: In the *Inferiour Order* of *Pneumaticalls* there is *Aire* and *Flame*: And in the *Superiour*, there is the *Body* of the *Starre*, and the *Pure Sky*. And these Paires, though they be unlike in the Primitive Differences of Matter, yet they seeme to have many Consents: For *Mercury* and *Sulphure* are principall Materialls of *Metalls*; *Water* and *Oyle*, are principall Materials of *Vegetables*, and *Animals*; And seeme to differ but in *Maturation*, or *Concoction*: *Flame* (in Vulgar Opinion) is but *Aire Incensed*; And they both have Quickenesse of Motion, and Facilitie of Cession, much a like: And the *Interstellar Sky*, (though the Opinion be vaine, that the *Starre* is the *Denser Part* of his *Orbe*,) hath notwithstanding so much Affinity with the *Starre*, that there is a Rotation of that, as well as of the *Starre*. Therefore, it is one of the greatest *Magnalia Naturæ*, to turne *Water*, or *Watry Juyce* into *Oile* or *Oily* Juyce: Greater in Nature, than to turne *Silver*, or *Quick-silver*, into *Gold*.

The Instances wee have, wherein *Crude* and *watry* Substance turneth into *Fat* and *Oily*, are of foure kindes. First in the *Mixture* of *Earth* and *Water*; which mingled by the helpe of the Sunne, gather a Nitrous Fatnesse, more than either of them have severally; As we see, in that they put forth *Plants*, which need both Juyces. 355

The Second is in the *Assimilation* of *Nourishment*, made in the *Bodies* of *Plants*, and *Living Creatures*; Whereof *Plants* turne the Juyce of meere *Water* and *Earth*, into a great deale of *Oily Matter*: *Living Creatures*, 356

tures, though much of their *Fat*, and *Flesh*, are out of *Oily Aliments*; (as *Meat*, and *Bread*,) yet they Assimilate also in a Measure their *Drinke* of *Water*, &c. But these two Wayes of *Version* of *Water* into *Oyle*, (namely by *Mixture*, and by *Assimilation*) are by many Passages, and Percolations, and by long Continuance of soft *Heats*, and by Circuits of Time.

357 The third is in the *Inception* of *Putrefaction*; As in *Water Corrupted*; And the *Mothers* of *Waters Distilled*; Both which have a kinde of *Fatnesse*, or *Oyle*.

358 The Fourth is in the *Dulceration* of some *Metalls*; As *Saccharum Saturni*, &c.

359 The Intention of *Version* of *Water* into a more *Oyly Substance*, is by *Disgestion*; For *Oile* is almost Nothing else but *Water Disgested*; And this *Disgestion* is principally by *Heat*; Which *Heat* must be either *Outward*, or *Inward*: Againe, it may be by Provocation, or Excitation; Which is caused by the Mingling of Bodies already *Oily*, or *Disgested*; For they will somewhat Communicate their Nature with the rest. *Disgestion* also is strongly effected by direct *Assimilation*, of *Bodies Crude* into *Bodies Disgested*; As in *Plants*, and *Living Creatures*, whose Nourishment is far more Crude than their Bodies: But this *Disgestion* is by a great Compasse, as hath beene said. As for the more full Handling of these two Principles, whereof this is but a Taste; (the Enquiry of which is one of the Profoundest Enquiries of Nature,) We leave it to the *Title* of *Version* of *Bodies*; And likewise to the *Title* of the *First Congregations* of *Matter*; Which like a Generall Assembly of Estates, doth give Law to all *Bodies*.

Experiment Solitary touching *Chameleons*.

360 A *Chameleon* is a Creature about the Bignesse of an Ordinary *Lizard*: His Head unproportionably bigge; His eyes great: He mooveth his Head without the writhing of his Necke, (which is inflexible,) as a *Hogge* doth: His Backe crooked; His Skin spotted with little Tumours, lesse Eminent nearer the Belly; His Taile slender, and long: On each Foot he hath five Fingers; three on the Outside, and two on the Inside; His Tongue of a marvellous Length in respect of his Body, and hollow at the end; Which he will launch out to prey upon *Flies*. Of Colour Greene, and of a dusky Yellow, brighter and whiter towards the Belly; Yet spotted with Blew, White, and Red. If he be laid upon Greene, the Greene predominateth; If upon Yellow, the Yellow; Not so if he be laid upon Blew, or Red, or White; Onely the Greene Spots receive a more Orient Lustre; Laid upon Blacke, he looketh all Blacke, though not without a Mixture of Greene. He feedeth not onely upon Aire, (though that be his principall Sustenance;) For sometimes hee taketh *Flies*, as was said; Yet some that have kept *Chameleons* a whole yeare together, could never perceive that ever they fed upon any Thing else but Aire; And might observe their Bellies to swell after they had exhausted the Aire, and closed their Jawes; Which they open commonly

monly againſt the Rayes of the Sunne. They have a fooliſh Tradition in *Magicke*, that if a *Chameleon* be burnt upon the Top of an Houſe, it will raiſe a Tempeſt; Suppoſing (according to their vaine Dreames of *Sympathies*) becauſe hee nouriſheth with Aire, his Body ſhould have great vertue to make Impreſſion upon the Aire.

Experiment Solitary, touching *Subterrany Fires*. 361

IT is reported by one of the *Ancients*, that in Part of *Media*, there are *Eruptions* of *Flames* out of *Plaines*; And that thoſe *Flames* are cleare, & caſt not forth ſuch Smoake, and Aſhes, and Pummice, as *Mountaine Flames* doe. The Reaſon (no doubt) is, becauſe the *Flame* is not pent, as it is in *Mountaines*, and *Earth-quakes* which caſt *Flame*. There be alſo ſome *Blinde Fires*, under *Stone*, which flame not out, but *Oile* being powred upon them, they flame out. The Cauſe whereof is, for that it ſeemeth, the *Fire* is ſo choaked, as not able to remove the Stone, it is *Heat*, rather than *Flame*; Which nevertheleſſe is ſufficient to Enflame the *Oyle*.

Experiment Solitary touching *Nitre*. 362

IT is reported, that in ſome *Lakes*, the *Water* is ſo *Nitrous*, as if Foule Cloaths be put into it, it ſcoureth them of it ſelfe: And if they ſtay any whit long, they moulder away. And the Scouring Vertue of *Nitre* is the more to be noted, becauſe it is a *Body Cold*; And wee ſee *Warme Water* ſcoureth better than *Cold*. But the Cauſe is, for that it hath a Subtill Spirit, which ſevereth and divideth any thing that is foule, and Viſcous, and ſticketh upon a Body.

Experiment Solitary touching *Congealing* of *Aire*. 363

TAke a *Blader*, the greateſt you can get; Fill it full of Winde, and tye it about the Necke with a Silke thred waxed; And upon that likewiſe Wax very cloſe; So that when the Neck of the *Bladder* dryeth, no *Aire* may poſſibly get in, nor out. Then bury it three or foure foot under the *Earth*, in a *Vault*, or in a *Conſervatory* of *Snow*, the *Snow* being made hollow about the *Bladder*; And after ſome Fortnights diſtance, ſee whether the *Bladder* be ſhruncke: For if it be, then it is plaine, that the *Coldneſſe* of the *Earth*, or *Snow*, hath Condenſed the *Aire*, and brought it a Degree nearer to *Water*: Which is an *Experiment* of great Conſequence.

Experiment Solitary touching *Congealing* of *Water* into *Chryſtall*. 364

IT is a Report of ſome good credit, that in *Deepe Caves*, there are *Penſile Cryſtall*, and *Degrees* of *Chryſtall* that drop from above; And in ſome other, (though more rarely) that riſe from below. Which though it be chiefly the Worke of Cold, yet it may bee, that Water, that paſſeth thorow the Earth, gathereth a Nature more clammy, and fitter to Congeale, and becomes Solide, than Water of it ſelfe. Therefore Triall would be made, to lay a Heape of Earth, in great Froſts, upon a Hollow Veſſell, putting a Canvaſe between, that it falleth not in: And poure Water upon it, in ſuch Quantitie as will be ſure to ſoake thorow; And ſee whether it will not make an harder Ice in the bottome of the Veſſell, and

and lesse apt to dissolve, than ordinarily. I suppose also, that if you make the Earth narrower at the bottome, than at the Top, in fashion of a Sugar Loafe Reversed, it will helpe the Experiment. For it will make the Ice, where it Issueth, lesse in Bulke; And evermore Smalnesse of Quantity is a Helpe to *Version.*

Experiment Solitary touching *Preserving* of *Rose-leaves*, both in *Colour*, and *Smell.*

365

TAke *Damaske Roses*, and pull them; Then dry them upon the Top of an House, upon a Lead or Tarras, in the hot Sun, in a cleare day, between the Houres (onely) of twelue and two; or there abouts. Then put them into a Sweet *Dry Earthen Bottle*, or a *Glasse*, with narrow Mouthes, stuffing them close together, but without Bruising: Stop the *Bottle*, or *Glasse*, close, and these *Roses* will retaine, not onely their Smell Perfect, but their Colour fresh, for a yeare at least. Note, that Nothing doth so much destroy any Plant, or other body, either by *Putrefaction*, or *Arefaction*, as the *Adventitious Moisture*, which hangeth loose in the Body, if it bee not drawne out. For it betrayeth and tolleth forth the *Innate* and *Radicall Moisture*, along with it, when it selfe goeth forth. And therefore in *Living Creatures*, Moderate Sweat doth preserve the Juyce of the Body. Note that these *Roses*, when you take them from the *Drying*, have little or no *Smell*; So that the Smell is a Second *Smell*, that issueth out of the *Flower* afterwards.

Experiments in Consort, touching the *Continuance* of *Flame.*

366

THe *Continuance* of *Flame*, according unto the diversity of the *Body Enflamed*, & other Circumstances, is worthy the Enquiry; Chiefly, for that though *Flame* be (almost) of a Momentany Lasting, yet it receiveth the More, and the Lesse: we will first therefore speake (at large) of *Bodies Enflamed*, wholly, and Immediately, without any *Wicke* to helpe the *Inflammation.* A Spoonefull of *Spirit* of *Wine*, a little heated, was taken, and it burnt as long as came to 116. Pulses. The same Quantity of *Spirit* of *Wine*, Mixed with the Sixth Part of a Spoonefull of *Nitre* burnt but to the space of 94. Pulses. Mixed with the like Quantity of *Bay-salt*, 83. Pulses. Mixed with the like Quantity of *Gunpowder*, which dissolved into a Blacke water, 110. Pulses. A Cube, or Pellet of *Yellow waxe*, was taken, as much as halfe the *Spirit* of *Wine*, and set in the Middest, and it burnt onely to the space of 87. Pulses. Mixed with the Sixth Part of a spoonefull of *Milke*, it burnt to the space of 100. Pulses; And the *Milke* was crudled. Mixed with the Sixth Part of a spoonefull of *Water*, it burnt to the space of 86. Pulses; With an *Equall Quantity* of *Water*, onely to the space of 4. Pulses. A small *Pebble* was laid in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. A Peece of *Wood*, of the Bignesse of an Arrow, and about a Fingers length, was set up in the Middest, and the *Spirit* of *Wine* burnt to the space of 94. Pulses. So that the *Spirit* of *wine Simple*, endured the longest; And the *Spirit* of *Wine* with the *Bay-salt*, and the *Equall Quantity* of *Water*, were the shortest.

367

Consider well, whether the more speedy *Going forth of the flame*, be caused,

caused, by the *Greater Vigour* of the *Flame* in *Burning*; Or by the *Resistance* of the *Body mixed*, and the *Aversion* thereof to take *Flame*: Which will appeare by the Quantitie of the *Spirit* of *Wine*, that remaineth after the Going out of the *Flame*. And it seemnth cleerely to be the latter, For that the Mixture of Things least apt to burne, is the Speediest in going out. And note, by the way, that *Spirit* of *wine* burned, till it goe out of it selfe, will burne no more; And tasteth nothing so hot in the Mouth, as it did; No nor yet sowre, (as if it were a degree towards *Vinegar*,) which *Burnt Wine doth*; but flat and dead.

Note, that in the *Experiment* of *Wax* aforesaid, the *Wax* dissolved in the burning, and yet did not incorporate it selfe, with the *Spirit* of *wine*, to produce one *Flame*; but whersoever the *Wax* floated, the *Flame* forsooke it, till at last it spread all over, and put the *Flame* quite out.

The *Experiments* of the *Mixtures* of the *Spirit* of *Wine enflamed*, are Things of discoverie, and not of Use: But now wee will speake of the *Continuance* of *Flames*, such as are used for *Candles*, *Lamps*, or *Tapers*; consisting of *Inflammable Matters*, and of a *wieke* that provoketh *Inflamation*. And this importeth not only Discoverie, but also Use and Profit; For it is a great Saving, in all such Lights, if they can be made as faire and bright as others, and yet last longer. *Wax Pure* made into a Candle, and *Wax Mixed* severally into Candle-stuffe, with the Particulars that follow; (viz. *Water*, *Aqua-vitæ*, *Milke*, *Bay-salt*, *Oyle*, *Butter*, *Nitre*, *Brimstone*, *Saw-dust*,) Every of these bearing a Sixth Part to the *wax*; And every of these *Candels Mixed*, being of the same Weight and Wieke with the *Wax Pure*, proved thus in the Burning, and Lasting. The Swiftest in Consuming was that with *Saw-dust*; Which first burned faire, till some part of the *Candle* was consumed, and the Dust gathered about the Snaste; But then it made the Snaste bigge, and long, and to burne dusk ishly, and the *Candle* wasted in halte the time of the *Wax Pure*. The next in Swiftnesse, were the *Oyle*, and *Butter*, which consumed, by a Fifth part, swifter than the *Pure Wax*. Then followed in Swiftnesse the *Cleare Wax* it selfe. Then the *Bay-Salt*, which lasted about an Eighth part longer than the *Cleare wax*. Then followed the *Aqua-vitæ*, which lasted about a Fifth part longer than the *Cleare Wax*. Then followed the *Milke*, and *Water*, with little difference from the *Aqua-vitæ*, but the *Water* slowest. And in these foure last, the *Wieke* would spit forth little Sparks. For the *Nitre*, it would not hold lighted above some Twelve Pulses; But all the while it would spit out Portions of *Flame*, which afterwards would goe out into a vapour. For the *Brimstone*, it would hold lighted, much about the same with the *Nitre*; But then after a little while, it would harden and cake about the Snaste; So that the Mixture of *Bay-Salt* with *Wax*, will winne an Eighth part of the time of lasting; and the *Water* a Fifth.

After the Severall *Materialls* were tried, Triall was likewise made of severall *Wiekes*; As of Ordinary *Cotton*; *Sowing Thred*; *Rush*; *Silke*; *Straw*; and *Wood*. The *Silke*, *Straw*, and *Wood*, would flame a little, till they

they came to the *Wax*, and then goe out: of the Other Three, the *Thred* conſumed faſter than the *Cotten*, by a Sixth part of Time: The *Cotton* next: Then the *Ruſh* conſumed ſlower than the *Cotton*, by at leaſt a third part of time. For the Bigneſſe of the *Flame*, the *Cotton*, and *Thred*, caſt a *Flame* much alike; and the *Ruſh* much leſſe, and dimmer. *Quære*, whether *Wood*, and *Wiekes* both, as in *Torches*, conſume faſter, than the *Wiekes Simple?*

371 Wee have ſpoken of the Severall *Materialls*, and the Severall *wiekes*: But to the *laſting* of the *Flame*, it importeth alſo; Not only what the *Materiall* is, but in the ſame *Materiall*, whether it be Hard, Soft, Old, New &c. Good *Houſwives*, to make their *Candles* burne the longer, uſe to lay them (one by one) in *Bran*, or *Flower*, which make them harder, and ſo they Conſume the ſlower: Inſomuch, as by this meanes, they will out-laſt other *Candles*, of the ſame Stuffe, almoſt Halfe in Halfe. For *Bran* and *Flower* have a Vertue to Harden: So that both Age, and lying in the Bran, doth helpe to the Laſting. And wee ſee that *wax Candles* laſt longer than *Tallow Candles*, bacauſe *wax* is more firme, and hard.

372 The *Laſting* of *Flame* alſo dependeth upon the *eaſie Drawing* of the *Nowriſhment*; As we ſee in the *Court* of *England*, there is a Service which they call *All-night*; which is (as it were) a great Cake of Wax, with the Wieke in the Middeſt; whereby it commeth to paſſe, that the Wieke fetcheth the Nouriſhment further off. Wee ſee alſo that *Lamps* laſt longer, becauſe the Veſſell is farre broader, than the Bredth of a Taper, or Candle.

373 Take a *Turreted Lampe* of *Tinne*, made in the forme of a Squire; The Heighth of the *Turret* being thrice as much, as the length of the lower part, whereupon the *Lampe* ſtandeth: Make only one Hole in it, at the Ende of the Returne furtheſt from the *Turret*. Reverſe it, and fill it full of *Oile*, by that Hole; And then ſet it upright againe; And put a Wieke in at the Hole; And lighten it: You ſhall finde, that it will burne ſlow, and a long time. Which is cauſed, (as was ſaid laſt before,) for that the *Flame* fetcheth the *Nouriſhment a farre off*. You ſhall finde alſo, that as the *Oile* waſteth, and deſcendeth, ſo the Top of the *Turret*, by little and little, filleth with Aire; which is cauſed by the Rarefaction of the Oile by the Heat. It were worthy the Obſervation, to make a Hole, in the Top of the *Turret*, and to trie, when the *Oile* is almoſt conſumed, whether the *Aire* made of the *Oile*, if you put to it a *Flame* of a *Candle*, in the letting of it forth, will Enflame. It were good alſo to have the *Lampe* made, not of *Tinne*, but of *Glaſſe*, that you may ſee how the Vapour, or Aire gathereth, by degrees, in the Top.

374 A fourth Point, that importeth the *laſting* of the *Flame*, is the *Cloſeneſſe* of the *Aire*, wherein the *Flame* burneth. Wee ſee, that if *Wind* bloweth upon a *Candle*, it waſteth apace. We ſee alſo, it laſteth longer in a *Lanthorne*, than at *large*. And there are Traditions of *Lamps*, and *Candles*, that have burnt a very long time, in *Caves*, and *Tombes*.

375 A Fifth Point, that importeth the *Laſting* of the *Flame*, is the *Nature* of

of the *Aire*; where the *Flame* burneth; whether it bee Hot or Cold; Moist or Drie. The *Aire*, if it be very *Cold*, irritateth the *Flame*, and maketh it burne more fiercely; (As Fire scorcheth in Frostie weather;) And so furthereth the *Consumption*. The *Aire* once heated, (I conceive) maketh the *Flame* burne more mildly, and so helpeth the *Continuance*. The *Aire*, if it be *Drie*, is indifferent: The *Aire*, if it be *Moist*, doth in a Degree quench the *Flame*: (As wee see *Lights* will goe out in the *Damps* of *Mines*:) And howsoever maketh it burne more dully: And so helpeth the *Continuance*.

Experiments in Consort, touching *Burialls* or *Infusions* of diuers *Bodies* in *Earth*.

376

Vrialls in *Earth* serve for *Preservation*; And for *Condensation*; And for *Induration* of *Bodies*. And if you intend *Condensation*, or *Induration*, you may burie the *Bodies* so, as *Earth* may touch them: As if you will make *Artificiall Porcellane*, &c. And the like you may doe for *Conservation*, if the *Bodies* be Hard, and Solid; As Clay, Wood, &c. But if you intend *Preservation* of *Bodies*, more Soft and Tender, then you must doe one of these two: Either you must put them in *Cases*, whereby they may not touch the *Earth*; Or else you must *vault* the *Earth*, whereby it may hang over them, and not touch them; For if the *Earth* touch them, it will doe more hurt, by the Moisture, causing them to putrifie, than good by the virtuall Cold, to conserve them; Except the *Earth* be very Drie, and Sandie.

377

An *Orenge*, *Limon*, and *Apple*, wrapt in a Linnen Cloth, being buried for a Forthnights Space, foure Foot deepe within the Earth, though it were in a Moist Place, and a Rainie Time, yet came forth, no wayes Mouldie, or Rotten, but were become a little harder than they were; Otherwise fresh in their Colour; But their Juyce somewhat flatted. But with the *Buriall* of a Forthnight more they became Putrified.

378

A *Bottle* of *Beere*, *buried* in like manner, as before, became more lively, better tasted, and Clearer, than it was. And a *Bottle* of *Wine* in like manner. A *Bottle* of *Vinegar*, so buried, came forth more lively, and more Odoriferous, smelling almost like a Violet. And after the whole Moneths *Buriall*, all the Three came forth, as fresh and lively, if not better, than before.

379

It were a profitable *Experiment*, to preserve *Orenges*, *Limons*, and *Pomgranates*, till Summer; For then their Price will bee mightily increased. This may be done, if you put them in a Pot or Vessell, well covered, that the *Moisture* of the *Earth* come not at them; Or else by putting them in a *Conservatorie* of *Snow*. And generally, whosoever will make *Experiments* of *Cold*, let him bee provided of three Things; A *Conservatorie* of *Snow*; A good *large Vault*, twenty foot at least under the Ground; And a *Deepe Well*.

380

There hath beene a Tradition, that *Pearle*, and *Corall*, and *Turchois-Stone*, that have lost their Colours, may be recovered by *Burying* in the *Earth*: Which is a thing of great profit, if it would sort: But upon Triall of Six Weekes *Buriall*, there followed no Effect. It were good to trie it,

in

in a *Deepe Well*; Or in a *Conservatory* of *Snow*, where the Cold may bee more Constringent; And so make the *Body* more united, and thereby more Resplendent.

Experiment Solitary touching the *Affects in Mens Bodies* from *Severall Winds*. 381

MEns *Bodies* are heavier, and lesse disposed to Motion, when *Southern Winds* blow, than when *Northerne*. The *Cause* is, for that when the *Southerne Winds* blow, the Humours doe (in some Degree) melt, and wax fluide, and so flow into the Parts; As it is seene in *wood*, and other *Bodies*; which, when the *Southerne Winds* blow, doe swell. Besides, the Motion and Activity of the Body consisteth chiefly in the Sinewes, which, when the *Southerne Wind* bloweth, are more relax.

Experiment Solitary touching *Winter* and *Summer Sicknesses*. 382

IT is commonly seene, that more are *Sicke* in the *Summer*, and more *Dye* in the *Winter*; Except it be in *Pestilent Diseases*, which commonly raigne in *Summer*, or *Autumne*. The Reason is, because *Diseases* are bred (indeed) chiefly by *Heat*; But then they are Cured most by *Sweat*, and *Purge*, which in the *Summer* commeth on, or is provoked, more Easily: As for *Pestilent Diseases*, the Reason why most Dye of them in *Summer*, is because they are bred most in the *Summer*; For otherwise those that are touched are in most Danger in the *winter*.

Experiment Solitary touching *Pestientiall Seasons*. 383

THe Generall Opinion is, that *Yeares Hot* and *Moist*, are most *Pestilent*; Upon the Superficiall Ground, that *Heat* and *Moisture* cause *Putrefaction*. In *England* it is found not true; For, many times, there have beene great *Plagues* in *Dry Yeares*. Whereof the Cause may be, for that *Drought* in the Bodies of *Islanders*, habituate to *Moist Aires*, doth Exasperate the Humours, and maketh them more apt to Putrifie, or Enflame: Besides, it tainteth the *waters* (commonly,) and maketh them lesse wholesome. And againe in *Barbary*, the *Plagues* breake up in the *Summer-moneths*, when the *Weather* is *Hot* and *Dry*.

Experiment Solitary touching an *Error received* about *Epidemicall Diseases*. 384

MAny *Diseases*, (both *Epidemicall* and others,) breake forth at *Particular times*. And the *Cause* is falsely imputed to the *Constitution* of the *Aire*, at *that time*, when they *breake forth*, or *raigne*; whereas it proceedeth (indeed) from a *Precedent Sequence*, and *Series* of the *Seasons* of the *Yeare*: And therefore *Hippocrates*, in his *Prognosticks*, doth make good Observations, of the *Diseases*, that ensue upon the *Nature*, of the *Precedent foure Seasons* of the *Yeare*.

Experiment Solitary touching the *Alteration* or *Preservation* of *Liquors* in *Wells*, or *deepe Vaults*. 385

TRiall hath beene made, with *Earthen Bottles* well stopped, hanged in a *Well* of Twenty Fathome deepe, at the least; And some of the *Bottles* have beene let downe into the *Water*, some others have hanged above, within about a fathome of the *Water*; And the *Liquours* so tried have beene, *Beere*, (not New, but Ready for drinking,) and *Wine*, and *Milke*. The Proofe hath beene, that both the *Beere*, and the *Wine*, (as well within *Water*, as above,) have not beene palled or deaded at all; But

as

as good, or somewhat better, than *Bottles* of the same *Drinks*, and Staleness, kept in a *Cellar*. But those which did hang above *Water*, were apparently the best; And that *Beere* did flower a little; whereas that under *Water* did not, though it were Fresh. The *Milke* sowered, and began to Putrifie. Nevertheless it is true, that there is a *Village* neare *Blois*, where in *Deepe Caves* they doe thicken *Milke*; In such sort, that it becommeth very pleasant; Which was some *Cause* of this Triall of Hanging *Milke* in the *well*: But our proofe was naught; Neither doe I know, whether that *Milke* in those *Caves*, be first boyled. It were good therefore to try it with *Milke* Sodden, and with Creame; For that *Milke* of it selfe is such a Compound Body, of *Creame*, *Curds*, and *Whey*, as it is easily Turned, and Dissolved. It were good also to try the *Beere*, when it is in *wort*, that it may be seene, whether the *Hanging* in the *Well*, will Accelerate the *Ripening* and *Clarifying* of it.

Experiment Solitary, touching *Stutting*. 386

DIvers, wee see, doe *Stut*. The *Cause* may bee, (in most,) the *Refrigeration* of the *Tongue*; Whereby it is lesse apt to move. And therefore we see, that *Naturalls* doe generally *Stut*: And we see that in those that *Stut*, if they drinke Wine moderately, they *Stut* lesse, because it heateth: And so we see, that they that *Stut*, doe *Stut* more in the first Offer to speake, than in Continuance; Because the *Tongue* is, by Motion, somewhat heated. In some also, it may be, (though rarely,) the *Drinesse* of the *Tongue*; which likewise maketh it lesse apt to move, as well as *Cold*; For it is an Affect that it cometh to some *Wise* and *Great Men*; As it did unto *Moses*, who was *Linguæ præpeditæ*; And many *Stutters* (wee finde) are very *Cholericke Men*; *Choler* Enducing a *Drinesse* in the *Tongue*.

Experiments in Consort, touching *Smells*. 387

Smells, and other *Odours*, are Sweeter in the Aire, at some Distance, than neare the Nose; As hath beene partly touched heretofore. The *Cause* is double: First the finer Mixture, or Incorporation of the *Smell*: For wee see that in *Sounds* likewise, they are Sweetest, when we cannot heare every Part by it selfe. The other *Reason* is, for that all *Sweet Smells* have joyned with them, some *Earthy* or *Crude Odours*; And at some distance the *Sweet*, which is the more Spirituall, is Perceived; And the *Earthy* reacheth not so farre.

388

Sweet Smells are most forcible, in *Dry Substances*, when they are *Broken*; And so likewise in *Orenges*, or *Limons*, the Nipping of their Rinde, giveth out their *Smell* more: And generally, when *Bodies* are *Moved* or *Stirred*, though not *Broken*, they *Smell* more; As a Sweet-Bagge waved. The *Cause* is double: The one, for that there is a *Greater Emission* of the *Spirit*, when Way is made: And this holdeth in the *Breaking*, *Nipping*, or *Crushing*; It holdeth also, (in some degree) in the Moving: But in this last, there is a Concurrence of the Second *Cause*; Which is the *Impulsion* of the *Aire*, that bringeth the *Sent* faster upon us.

389

The daintiest *Smells* of *Flowers*, are out of those *Plants*, whose *Leaves*

smell not; As *Violets*, *Roses*, *Wall-flowers*, *Gilly-flowers*, *Pincks*, *Woodbines*, *Vine-flowers*, *Apple-Bloomes*, *Lime-Tree Bloomes*, *Beane-Bloomes*, &c. The *Cause* is, for that where there is Heat and strength enough in the *Plant*, to make the *Leaves Odorate*, there the *Smell* of the *Flower* is rather Evanide and Weaker, than that of the *Leaves*; As it is in *Rose-Mary-Flowers*, *Lavender-Flowers*, and *Sweet-Brior-Roses*. But where there is lesse Heat, there the *Spirit* of the *Plant*, is disgested and refined, and severed from the Grosser Juyce, in the *Efflorescence*, and not before.

390 Most *Odours* smell best, *Broken* or *Crushed*, as hath beene said; But *Flowers Pressed* or *Beaten*, doe leese the Freshnesse and Sweetnesse of their *Odour*. The *Cause* is, for that when they are *Crushed*, the Grosser and more *Earthy Spirit* commeth out with the Finer, and troubleth it; Whereas in stronger *Odours* there are no such Degrees of the Issue of the *Smell*.

Experiments in Consort, touching the *Goodnesse* and *Choice of Water*.

IT is a Thing of very good Use, to Discover the *Goodnesse* of *Waters*. The *Taste*, to those that Drinke *Water* only, doth somewhat: But other *Experiments* are more sure. First, try *Waters* by *Weight*; Wherein you may finde some difference, though not much: And the *Lighter* you

391 may account the Better.

392 Secondly, try them by *Boyling* upon an *Equall Fire*: And that which consumeth away fastest, you may account the Best.

393 Thirdly, try them in *Severall Bottles*, or Open Vessells, Matches in every Thing else, and see which of them *Last Longest*, without *Stench*, or *Corruption*. And that which holdeth Unputrified longest, you may likewise account the Best.

394 Fourthly, try them by *Making Drinkes* Stronger, or Smaller, with the same *Quantity* of *Mault*; And you may conclude, that that *water*, which maketh the *Stronger Drinke*, is the more Concocted, and Nourishing; though perhaps it bee not so good for *Medicinall use*. And such *Water* (commonly) is the *Water* of *Large* and *Navigable Rivers*: And likewise in *Large* and *Cleane Ponds* of *Standing water*: For upon both them, the Sunne hath more power, than upon Fountaines, or Small Rivers. And I conceieve that *Chalke-water* is next them the best, for going furthest in *Drinke*: For that also helpeth *Concoction*; So it bee out of a *Deepe Well*; For then it Cureth the Rawnesse of the *Water*; But *Chalkie Water*, towards the Top of the Earth, is too fretting; As it appeareth in Laundry of Cloaths, which weare out apace, if you use such *Waters*.

395 Fifthly, the Housewives doe finde a Difference in *Waters*, for the *Bearing*, or *Not Bearing* of *Soape*: And it is likely that the more *Fat Water* will beare *Soape* best; For the *Hungry water* doth kill the Unctuous Nature of the *Soape*.

396 Sixthly, you may make a Judgement of *Waters*, according to the *Place*, whence they Spring, or Come: The *Raine-water* is by the *Physitians* esteemed the Finest, and the best; But yet it is said to putrifie soonest; which is likely, because of the Fineness of the Spirit: And in *Conservatories*

servatories of *Raine-water*, (such as they have in *Venice*, &c.) they are found not so Choice *waters*; The worse, (perhaps,) because they are Covered aloft, and kept from the Sunne. *Snow-water* is held unwholesome; In so much as the People, that dwell at the Foot of the *Snow-Mountaines*, or otherwise upon the Ascent, (especially the Women,) by drinking of *Snow-water*, have great Bagges hanging under their Throats. *Well-water*, except it bee upon *Chalke*, or a very plentifull Spring, maketh Meat Red; which is an ill Signe. *Springs* on the *Tops* of *High-Hills* are the best: For both they seeme to have a Lightnesse, and Appetite of Mounting; And besides they are most pure and Vnmingled; And againe are more Percolated thorow a great Space of Earth. For *Waters* in *Valleyes*, joyne in effect under Ground with all *Waters* of the same Levell; Whereas *Springs*, on the *Tops* of *Hills*, passe thorow a great deale of Pure *Earth*, with lesse Mixture of other *Waters*.

Seventhly, Judgement may bee made of *Waters* by the *Soyle whereupon the Water runneth*; As *Pebble* is the Cleanest, and best tasted; And next to that *Clay-water*; And Thirdly, *Water* upon *Chalke*; Fourthly that upon *Sand*; And Worst of all upon *Mudde*. Neither may you trust *Waters* that *Taste Sweet*; For they are commonly found in Rising Grounds of great *Cities*; which must needs take in a great deale of Filth. 397

IN *Peru*, and divers Parts of the *West Indies*, though under the *Line*, the *Heats* are not so Intolerable, as they be in *Barbary*, and the Skirts of the *Torrid Zone*. The *Causes* are, First the Great *Brizes*, which the Motion of the Aire in great Circles, (such as are under the *Girdle* of the *World*,) produceth; Which doe refrigerate; And therefore in those Parts Noone is nothing so hot, when the *Brizes* are great, as about Nine or Ten of the Clocke in the Fore-Noone. Another *Cause* is, for that the Length of the Night, and the Dewes thereof, doe compense the *Heat* of the Day. A third *Cause* is the Stay of the Sunne; Not in Respect of Day and Night, (for that wee spake of before,) but in Respect of the Season; For under the *Line*, the Sunne crosseth the *Line*, and maketh two Summers, and two Winters; But in the Skirts of the *Torrid Zone*, it doubleth, and goeth backe againe, and so maketh one Long Summer. Experiment Solitary, touching the *Temperate Heat* under the *Æquinoctiall*. 398

THe *Heat* of the *Sunne* maketh *Men Blacke* in some Countries, as in *Æthiopia*, and *Ginny*, &c. *Fire* doth it not, as we see in *Glasse-Men*, that are continually about the *Fire*. The *Reason* may bee, because *Fire* doth licke up the *Spirits*, and Bloud of the Body, so as they Exhale; So that it ever maketh *Men* looke Pale, and Sallow; But the *Sunne*, which is a Gentler Heat, doth but draw the Bloud Experiment Solitary, touching the *Coloration* of *Blacke* and *Tawney Moores*. 399

to the Outward *Parts*; And rather Concocteth it, than Soaketh it: And therefore wee see that all *Æthiops* are Fleshy, and Plumpe, and have great Lips; All which betoken *Moisture* retained, and not drawne out. Wee see also, that the *Negroes* are breed in Countries that have plenty of *water*, by *Rivers*, or otherwise: For *Meroë*, which was the *Metropolis* of *Æthiopia*, was upon a great Lake: And *Congo*, where the *Negroes* are, is full of Rivers. And the Confines of the River *Niger*, where the *Negroes* also are, are well watered: And the Region about *Capo Verde*, is likewise Moist, in so much as it is pestilent through Moisture: But the Countries of the *Abyssines*, and *Barbary*, and *Peru*, where they are Tawney, and Olivaster, and Pale, are generally more Sandy, and Dry. As for the *Æthiopes*, as they are Plumpe, and Fleshy; So (it may bee) they are Sanguine, and ruddy Coloured, if their blacke Skinne would suffer it to be seene.

Experiment Solitary touching *Motion* after the *Instant* of *Death*.

400

SOme *Creatures* doe move a good while after their Head is off; As *Birds*; Some a very little time; As *Men*, and all beasts; Some move, though cut in severall Pieces; As *Snakes*, *Eeles*, *Wormes*, *Flies*, &c. First therefore it is certaine, that the *Immediate Cause* of *Death*, is the Resolution or Extinguishment of the *Spirits*; And that the Destruction or Corruption of the *Organs*, is but the *Mediate Cause*. But some *Organs* are so peremptorily necessary, that the Extinguishment of the Spirits doth speedily follow; But yet so, as there is an *Interim* of a Small Time. It is reported by one of the *Ancients*, of credit, that a *Sacrificed Beast* hath lowed, after the Heart hath beene seuered; And it is a Report also of Credit, that the *Head* of a *Pigge* hath beene opened, and the Braine put into the Palme of a Mans hand, trembling, without breaking any part of it, or severing it from the Marrow of the Back-bone; During which time the *Pigge* hath beene, in all appearance, starke dead, and without Motion; And after a small Time the Braine hath beene replaced, and the Skull of the *Pigge* closed, and the *Pigge* hath a little after gone about. And certaine it is, that an *Eye* upon *Revenge* hath beene thrust forth, so as it hanged a pretty distance by the *Visuall Nerve*; And during that time the *Eye* hath beene without any Power of *Sight*; And yet after (being replaced) recovered *Sight*. Now the *Spirits* are chiefly in the *Head*, and *Cells* of the *Braine*, which in *Men*, and *Beasts* are Large; And therefore, when the *Head* is off, they move little or nothing. But *Birds* have small *Heads*, and therefore the *Spirits* are a little more dispersed in the *Sinewes*, whereby Motion remaineth in them a little longer; In so much as it is Extant in Story, that an *Emperour* of *Rome*, to shew the Certainty of his Hand, did Shoote a great Forked Arrow at an *Estrich*, as shee ranne swiftly upon the Stage, and stooke off her Head;

And

And yet shee continued the Race, a little way, with the Head off.
As for *Wormes*, and *Flies*, and *Eeles*, the *Spirits* are diffused almost all over; And therefore they move in their Severall Pieces.

And yet these continued the Race a little way, with the Head off.
As for Worms, and Flies, and Eels, the Spirits are diffused al-
most all over; And therefore they move in
their Several Pieces.

NATVRALL HISTORIE.

V. Century.

WE will now enquire of *Plants* or *Vegetables*: And wee shall doe it with diligence. They are the principall Part of the *Third Dayes Worke*. They are the first *Producat*, which is the Word of *Animation*: For the other Words are but the Words of *Essence*; And they are of excellent and generall Vse, for Food, Medicine, and a Number of Mechanicall Arts.

Experiment in Consort, touching the *Acceleration* of *Germination*.

There were sowen in a *Bed*, *Turnip-Seed*, *Radish-Seed*, *Wheat*, *Cucumber-Seed*, and *Pease*. The *Bed* wee call a *Hot-Bed*, and the Manner of it is this. There was taken *Horse-dung*, old, and well rotted; This was laid upon a Banke, halfe a foot high, and supported round about with Planks; And upon the Top was cast Sifted Earth, some two Fingers deepe; And then the *Seed* sprinkled upon it, having beene steeped all night in *Water* Mixed with *Cow-dung*. The *Turnip-Seed*, and the *Wheat* came up halfe an Inch above Ground, within two dayes after, without any Watring. The Rest the third day. The *Experiment* was made in *October*; And (it may be) in the *Spring*, the *Accelerating* would have beene the speedier. This is a Noble *Experiment*; For without this helpe, they would have beene

401

beene foure times as long in comming up. But there doth not occurre to me, at this present, any use thereof, for profit; Except it should be for Sowing of *Pease*, which have their Price very much increased, by the early Comming. It may be tried also with *Cherries*, *Strawberries*, and other Fruit, which are deerest, when they come early.

402 There was *Wheat*, steeped in *Water* mixed with *Cow-Dung*; Other in *Water* mixed with *Horse-Dung*; Other in *Water* mixed with *Pigeon-Dung*; Other in *Vrine* of *Man*; Other in *water* mixed with *Chalke* powdred; Other in *Water* mixed with *Soot*; Other in *water* mixed with *Ashes*; Other in *water* mixed with *Bay-Salt*; Other in *Claret Wine*; Other in *Malmsey*; Other in *Spirit* of *Wine*. The Proportion of the Mixture was, a fourth Part of the Ingredients to the *water*; Save that there was not of the *Salt* above an eighth Part. The *Vrine*, and *Wines*, and *Spirit* of *Wine*, were Simple without Mixture of *water*. The Time of the Steeping was twelve houres. The Time of the Yeare *October*. There was also other *Wheat* sowen *unsteeped*, but *watred* twice a day with *warme water*. There was also other *Wheat* sowen *Simple* to compare it with the rest. The Event was; That those that were in the Mixture of *Dung*, and *Vrine*, and *Soot*, *Chalke*, *Ashes*, and *Salt*, came up within six dayes: And those that afterwards proved the Highest, Thickest, and most Lustie, were; First the *Vrine*; And then the *Dungs*; Next the *Chalke*; Next the *Soot*; Next the *Ashes*; Next the *Salt*; Next the *Wheat Simple* of it selfe, unsteeped, and unwatered; Next the *Watered twice a day* with warme water; Next the *Claret Wine*. So that these three last were slower than the ordinary *Wheat* of it selfe; And this Culture did rather retard, than advance. As for those that were steeped in *Malmsey*, and *Spirit* of *Wine*, they came not up at all. This is a Rich *Experiment* for Profit; For the most of the Steepings are Cheape Things; And the goodnesse of the Crop is a great Matter of Gaine; If the Goodnesse of the Crop answer the Earlinesse of the Comming up: As it is like it will; Both being from the vigour of the *Seed*; Which also partly appeared in the Former *Experiments*, as hath beene said. This *Experiment* would be tried in other *Graines*, *Seeds*, and *Kernells*: For it may bee some *Steeping* will agree best with some *Seeds*. It would bee tried also with *Roots* steeped as before, but for *longer time*. It would bee tried also in *Severall Seasons* of the *Yeere*, especially the *Spring*.

403 *Strawberries* watered now and then, (as once in three dayes,) with *Water*, wherein hath beene steeped *Sheepes-dung*, or *Pigeons-dung*, will prevent and come early. And it is like, the same Effect would follow in other *Berries*, *Herbs*, *Flowers*, *Graines*, or *Trees*. And therefore it is an *Experiment*, though vulgar in *Strawberries*, yet not brought into use generally: For it is usuall to helpe the Ground with Mucke; And likewise to Recomfort it sometimes with Mucke put to the Roots; But to water it with *Mucke water*, which is like to be more Forcible, is not practised.

404 *Dung*, or *Chalke*, or *Bloud*, applied in Substance, (seasonably,) to the Roots

Roots of Trees, doth set them forwards. But to doe it unto *Herbs*, without Mixture of *Water* or *Earth*, it may bee these Helpes are too Hot.

405 The former *Meanes* of Helping *Germination*, are either by the *Goodnesse* and *Strength* of the *Nourishment*; Or by the *Comforting*, and *Exciting* the *Spirits* in the *Plant*, to draw the Nourishment better. And of this latter kinde, concerning the *Comforting* of the *Spirits* of the *Plant*, are also the experiments that follow; Though they bee not Applications to the *Root*, or *Seed*. The *Planting* of *Trees warme* upon a *Wall*, against the South, or South-East Sunne, doth hasten their Comming on, and Ripening; And the South-East is found to bee better than the South-West, though the South-West bee the Hotter Coast. But the cause is chiefly, for that the Heat of the Morning succedeth the Cold of the Night: and partly, because (many times) the South-West Sunne is too Parching. So likewise the *Planting* of them upon the *Backe* of a *Chimney*, where a *Fire* is kept, doth hasten their Comming on, and Ripening: Nay more, the *Drawing* of the *Boughes* into the *Inside* of a *Roome*, where a Fire is continually kept, worketh the same Effect; Which hath beene tried with Grapes; In so much as they will come a Moneth earlier, than the Grapes abroad.

406 Besides the two *Meanes* of *Accelerating Germination*, formerly described; That is to say, the *Mending* of the *Nourishment*; and *Comforting* of the *Spirit* of the *Plant*; there is a Third; Which is the *Making way* for the *Easie Comming* to the *Nourishment*, and *Drawing* it. And therefore *Gentle Digging* and *Loosening* of the *Earth* about the *Roots* of *Trees*; And the *Removing Herbes* and *Flowers* into new Earth, once in two yeares, (which is the same thing; For the new Earth is ever looser,) doth greatly further the *Prospering*, and *Earlinesse* of *Plants*.

407 But the most admirable *Acceleration* by *Facilitating* the *Nourishment*, is that of *Water*. For a *Standard* of a *Damaske* Rose with the *Root* on, was set in a Chamber, where no Fire was, upright in an *Earthen Pan*, full of *Faire Water*, without any Mixture, halfe a foot under the *Water*, the *Standard* being more than two foot high above the *Water*: Within the Space of ten dayes, the *Standard* did put forth a faire Greene leafe, and some other little Buds, which stood at a stay, without any Shew of decay or withering, more than seven Daies. But afterwards that Leafe faded, but the young Buds did sprout on; which afterward opened into faire Leaves, in the space of three Moneths; And continued so a while after, till upon Removall wee left the Triall. But note that the *Leaves* were somewhat paler, and lighter-coloured, than the *Leaves* use to bee abroad. Note that the first *Buds* were in the End of *October*; And it is likely that if it had beene in the *Spring* time, it would have put forth with greater strength, and (it may bee) to have growne on to beare Flowers. By this Meanes, you may have, (as it seemeth,) *Roses* set in the middest of a *Poole*, being supported with some stay; Which is Matter of Rareneſſe and Pleasure, though of small Use. This is the more strange,

strange, for that the like *Rose-standard* was put, at the same time, into *Water* mixed with *Horse-dung*, the Horse-dung about the fourth Part to the *Water*, and in foure Moneths space (while it was observed) put not forth any *Leafe*, though divers *Buds* at the first, as the other.

408 A *Dutch Flower*, that had a *Bulbous Root*, was likewise put, at the same time, all under *Water*, some two or three Fingers deepe; And within seven dayes sprouted, and continued long after, further Growing. There were also put in, a *Beet-Root*, a *Borrage-Root*, and a *Raddish-Root*, which had all their *Leaves* cut almost close to the *Roots*; And within six weekes had fayre *Leaves*; And so continued, till the end of *November*.

409 Note that if *Roots*, or *Pease*, or *Flowers*, may bee *Accelerated* in their *Comming* and *Ripening*, there is a double Profit; The one in the high *Price* that those Things beare when they come early: The other in the *Swiftnesse* of their *Returnes*: For in some Grounds which are strong, you shall have a *Raddish*, &c. come in a Month; That in other Grounds will not come in two; And so make double *Returnes*.

410 *Wheat* also was put into the *Water*, and came not forth at all; So as it seemeth there must be some Strength and Bulke in the Body, put into the *Water* as it is in *Roots*; For *Graines*, or *Seeds*, the Cold of the *Water* will mortifie. But casually some *Wheat* lay under the Pan, which was somewhat moistned by the Suing of the Pan; which in six weekes (as aforesaid) looked mouldy to the Eye, but it was sprouted forth halfe a Fingers length.

411 It seemeth by these *Instances* of *Water*, that for Nourishment, the *Water*, is almost all in all, and that the *Earth* doth but keepe the *Plant* upright, and save it from Over-heat, and Over-cold; And therefore is a Comfortable *Experiment* for good *Drinkers*. It proveth also that our former *Opinion*; That Drinke incorporate with Flesh, or Roots, (as in *Capon-Beere*, &c.) will nourish more easily, than Meat and Drinke taken severally.

412 The *Housing* of *Plants* (I conceive) will both *Accelerate Germination*, and bring forth *Flowers* and *Plants* in the *Colder Seasons*: And as wee *House Hot Countrey Plants*, as *Limons*, *Orenges*, *Myrtles*, to save them; So wee may *House* our owne *Countrey Plants*, to forward them, and make them come in the Cold Seasons, In such sort, that you may have *Violets*, *Strawberries*, *Pease*, all Winter: So that you sow, or remove them at fit times. This *Experiment* is to be referred unto the *Comforting* of the *Spirit* of the *Plant*, by *Warmth*, as well as *Housing* their *Boughes*, &c. So then the *Meanes*, to *Accelerate Germination*, are in Particular eight, in Generall three.

Experiments in Consort, touching the *Putting backe* or *Retardation* of *Germination*.

413 TO make *Roses*, or other *Flowers* come late, it is an *Experiment* of Pleasure. For the Ancients esteemed much of *Rosa Sera*. And indeed the *November-Rose* is the sweetest, having beene lesse exhaled by the Sunne. The Meanes are these. First, the *Cutting off their Tops*, immediately after they have done Bearing; And then they will come againe the

the same yeare about *November*: But they will not come just on the Tops, where they were cut, but out of those Shoots, which were, (as it were,) *Water-Boughes*. The *Cause* is, for that the Sap, which otherwise would have fed the Top, (though after Bearing,) will, by the discharge of that, divert unto the Side-Sprouts; And they will come to beare, but later.

The Second is the *Pulling off the Buds of the Rose*, when they are *Newly knotted*; For then the Side-Branches will beare. The *Cause* is the same with the former: For *Cutting off the Tops*, and *Pulling off the Buds*, worke the same Effect, in Retention of the Sap for a time, and Diversion of it to the Sprouts, that were not so forward. 414

The Third is the *Cutting* off some few of the *Top-Boughes* in the *Spring-time*, but suffering the lower Boughes to grow on. The *Cause* is, for that the Boughes doe helpe to draw up the Sap more strongly; And we see that in Powling of Trees, many doe use to leave a Bough or two on the Top, to helpe to draw up the Sap. And it is reported also, that if you graft upon the Bough of a Tree, and cut off some of the old Boughes, the new Cions will perish. 415

The Fourth is by *Laying the Roots bare about Christmas*, some dayes. The *Cause* is plaine, for that it doth arrest the Sap, from going upwards, for a time; Which Arrest is afterwards released by the Covering of the Root againe with Earth; And then the Sap getteth up, but later. 416

The Fifth is the *Removing* of the *Tree*, some Moneth before it *Buddeth*. The *Cause* is, for that some time will be required after the *Remove*, for the Resetling, before it can draw the Juyce: And that time being lost, the Blossome must needs come forth later. 417

The Sixth is the *Grafting* of *Roses* in *May*, which commonly Gardiners doe not till *July*; And then they beare not till the Next Yeare; But if you graft them in *May*, they will beare the same yeare, but late. 418

The Seventh is, the *Girding* of the *Body* of the *Tree* about with some Pack-threed; For that also, in a degree, restraineth the Sap, and maketh it come up, more late, and more Slowly. 419

The Eighth is, the *Planting* of them in a *Shade*, or in a *Hedge*; The *Cause* is, partly the Keeping out of the Sunne, which hasteneth the Sap to rise; And partly the Robbing of them of Nourishment, by the Stuffe in the *Hedge*. These Meanes may be practised upon other, both Trees, and Flowers, *Mutatis Mutandis*. 420

Men have entertained a Conceit that sheweth prettily; Namely, that if you graft a *Late-Comming Fruit*, upon a Stocke of a *Fruit-tree* that *Commeth early*, the Graft will beare *Fruit Early*; As a Peach upon a Cherry; And contrariwise, if an *Early-Comming-Fruit* upon a Stocke of a *Fruit-Tree* that *Commeth late*, the Graft will beare Fruit late; As a Cherry upon a Peach. But these are but Imaginations, and untrue. The *Cause* is, for that the Cions overruleth the Stocke quite; And the Stocke is but Passive onely, and giveth Aliment, but no Motion to the Graft. 421

Wee

Experiments in Consort, touching the *Melioration* of *Fruits, Trees,* and *Plants.*

Wee will speake now, how to make *Fruits*, *Flowers*, and *Roots* larger; in more plenty; and sweeter; than they use to be; And how to make the *Trees* themselves, more Tall; more Spread; and more Hasty and Sudden; than they use to bee. Wherein there is no doubt, but the former *Experiments* of *Acceleration*, will serve much to these Purposes. And againe, that these *Experiments*, which we shall now set downe, doe serve also for *Acceleration*; because both Effects proceed from the Encrease of vigour in the Tree; But yet to avoid Confusion; And because some of the Meanes are more proper for the one Effect, and some for the other, wee will handle them apart.

422 It is an assured Experience, that an *Heape* of *Flint*, or *Stone*, laid about the *Bottome* of a *Wilde-Tree*, (as an Oake, Elme, Ash, &c.) upon the first Planting, doth make it prosper double as much, as without it. The *Cause* is, for that it retaineth the Moisture, which falleth at any time upon the *Tree*, and suffereth it not to be exhaled by the Sunne. Againe, it keepeth the Tree warme, from Cold Blasts and Frosts, as it were in an House. It may be also, there is somewhat in the Keeping of it steady at the first. *Quære*, if Laying of Straw some Height about the Body of a *Tree*, will not make the *Tree* forwards. For though the Root giveth the Sap, yet it is the Body that draweth it. But you must note, that if you lay *Stones* about the stalke of Lettuce, or other Plants, that are more soft, it will over-Moisten the Roots, so as the Wormes will eat them.

423 A *Tree*, at the first *Setting*, should not bee *Shaken*, untill it hath *taken Root fully*: And therefore some have put two little Forkes about the Bottome of their *Trees*, to keepe them upright; But after a yeares Rooting, then Shaking doth the *Tree* good, by Loosening of the Earth, and (perhaps) by Exercising (as it were) and Stirring the Sap of the *Tree*.

424 Generally, the *Cutting away* of *Boughes* and *Suckers* at the *Root* and *Body*, doth make *Trees* grow high; And contrariwise, the *Powling* and *Cutting* of the Top, maketh them grow spread, and bushy. As wee see in *Pollards*, &c.

425 It is reported, that to make *hasty Growing Coppice-Woods*, the way is, to take *Willow*, *Sallow*, *Poplar*, *Alder*, of some seven yeares growth; And to set them, not upright, but a-slope, a reasonable depth under the Ground; And then, in stead of one Root, they will put forth many, and so carry more Shoots upon a Stemme.

426 When you would have *many new Roots* of *Fruit-trees*, take a *Low Tree*, and bow it, and lay all his Branches a-flat upon the Ground, and cast Earth upon them; And every Twigge will take Root. And this is a very profitable *Experiment* for Costly *Trees*; (for the Boughes will make Stockes

Stocks without charge;) Such as are *Apricots*, *Peaches*, *Almonds*, *Cornelians*, *Mulberries*, *Figs*, &c. The like is continually practised with *Vines*, *Roses*, *Muske-Roses*, &c.

427. From *May* to *Iuly* you may take off the *Barke* of any *Bough*, being of the Bignesse of three or foure Inches, and cover the bare Place, somewhat above, and below, with Loame well tempered with Horse-dung, binding it fast downe. Then cut off the Bough about *Alhallontide* in the bare place, and set it in the Ground; And it will grow to be a faire *Tree* in one Yeare. The *Cause* may be, for that the *Baring* from the *Barke* keepeth the *Sap* from descending towards Winter, and so holdeth it in the Bough; And it may be also that the Loame and Horse-Dung applied to the bare place, doe moisten it, and cherish it, and make it more apt to put forth the Root. Note, that this may be a generall Meanes for keeping up the Sap of *Trees* in their Boughes; Which may serve to other Effects.

428. It hath beene practised in *Trees*, that shew faire, and beare not, to *Bore a Hole* thorow the *Heart* of the *Tree*, and thereupon it will beare. Which may be for that the *Tree* before had too much *Repletion*, and was oppressed with his owne Sap; For *Repletion* is an Enemie to Generation. *maxime*

429. It hath beene practised in *Trees*, that doe not beare, to cleave two or three of the Chiefe Roots, and to put into the Cleft a small Pebble, which may keepe it open, and then it will beare. The *Cause* may be, for that a Root of a Tree may be (as it were,) Hide-bound, no lesse than the Body of the Tree; but it will not keepe open without somewhat put into it.

430. It is usually practised, to set *Trees* that require much *Sunne*, upon *Walls* against the *South*; As *Apricots*, *Peaches*, *Plums*, *Vines*, *Figs*, and the like. It hath a double Commoditie; The one, the *Heat* of the *Wall* by *Reflexion*; The other, the *Taking away* of the *Shade*; For when a *Tree* groweth round, the upper Boughes over-shadow the lower: But when it is spread upon a Wall, the Sunne commeth alike, upon the upper, and lower Branches.

431. It hath also beene practised (by some) to pull off some *Leaves* from the *Trees* so *spread*, that the Sunne may come upon the *Bough* and *Fruit* the better. There hath beene practised also a Curiositie, to set a *Tree* upon the *North-Side* of a Wall, and at a little height, to draw him thorow the Wall, and spread him upon the *South-Side:* Conceiving that the Root and lower Part of the Stocke should enjoy the Freshnesse of the Shade; And the Upper Boughes, and Fruit, the Comfort of the Sunne. But it sorted not; The *Cause* is, for that the *Root* requireth some Comfort from the Sunne, though under Earth, as well as the *Bodie:* And the Lower Part of the Bodie more than the Upper, as wee see in Compassing a *Tree* below with straw.

432. The *Lownesse* of the *Bough*, where the *Fruit* commeth, maketh the *Fruit* greater, and to ripen better; For you shall ever see in *Apricots*,

Peaches, or *Melo-Cotones*, upon a wall, the greateſt Fruits towards the Bottome. And in *France* the *Grapes* that make the *Wine*, grow upon low Vines, bound to ſmall Stakes. And the raiſed Vines in Arbours make but Verjuyce. It is true, that in *Italy*, and other *Countries*, where they have hotter Sunne, they raiſe them upon *Elmes*, and Trees; But I conceive, that if the *French* Manner of Planting low, were brought in uſe there, their *Wines* would be ſtronger and ſweeter. But it is more chargeable in reſpect of the Props. It were good to trie whether a *Tree* grafted ſomewhat neare the Ground, and the lower boughes onely maintained, and the higher continually proined off, would not make a larger *Fruit*.

433 To have *Fruit* in *Greater Plentie*, the way is, to graft, not onely upon young *Stockes*, but upon divers *Boughes* of an old *Tree*; for they will beare great Numbers of Fruit; Whereas if you graft but upon one Stocke, the *Tree* can beare but few.

434 The *Digging* yearely about the *Roots* of *Trees*, which is a great meanes, both to the *Acceleration* and *Melioration* of *Fruits*, is practiſed in nothing but in *Vines*; Which if it were transferred unto other *Trees*, and *Shrubs*, (as *Roſes*, &c. I conceive would advance them likewiſe.

435 It hath beene knowne, that a *Fruit-Tree* hath beene blowne up (almoſt) by the Roots, and ſet up againe, and the next yeare bare exceedingly. The *Cauſe* of this, was nothing but the *Looſening* of the *Earth*, which comforteth any *Tree*, and is fit to be practiſed, more than it is, in *Fruit-Trees*: For *Trees* cannot be ſo fitly removed into New Grounds, as *Flowers* and *Herbs* may.

436 To revive an *Old Tree*, the Digging of it about the *Roots*, and Applying new Mould to the Roots, is the way. We ſee alſo that *Draught-Oxen*, put into freſh Paſture, gather new and tender Fleſh; And in all Things, better Nouriſhment than hath beene uſed, doth help to renew; Eſpecially, if it be not onely better, but changed, and differing from the former.

437 If an *Herb* be cut off from the *Roots*, in the beginning of Winter, and then the Earth be trodden and beaten downe hard, with the Foot and Spade, the *Roots* will become of verie great Magnitude in Summer. The Reaſon is, for that the Moiſture being forbidden to come up in the Plant, ſtayeth longer in the Root, and ſo dilateth it. And *Gardiners* uſe to tread downe any looſe Ground, after they have ſowne *Onions*, or *Turnips*, &c.

438 If *Panicum* be laid below, and about the Bottome of a *Root*, it will cauſe the Root to grow to an Exceſſive Bigneſſe. The *Cauſe* is, for that being it ſelfe of a Spungie Subſtance, it draweth the Moiſture of the Earth to it, and ſo feedeth the Root. This is of greateſt uſe for *Onions*, *Turnips*, *Parſnips*, and *Carrets*.

439 The *Shifting* of *Ground* is a Meanes to better the *Tree*, and Fruit; But with this Caution; That all Things doe proſper beſt, when they are advanced to the better: Your *Nurſerie* of *Stocks* ought to be in a more

Barren

Barren Ground, than the Ground is whereunto you remove them. So all *Graſiers* preferre their Cattell from meaner Paſtures to better. We ſee alſo, that Hardneſſe in Youth lengthneth Life, becauſe it leaveth a Cheriſhing to the better, of the Body, in Age: Nay in Exerciſes, it is good to begin with the hardeſt, as Dancing in Thicke Shooes &c.

It hath beene obſerved, that *Hacking* of *Trees* in their *Barke*, both downe-right, and acroſſe, ſo as you make them rather in ſlices, than in continued Hacks, doth great good to *Trees*; And eſpecially delivereth them from being *Hide-bound*, and killeh their Moſſe. 440

Shade to ſome *Plants* conduceth to make them large, and proſperous, more than *Sun*; As in *Strawberries*, and *Bayes*, &c. Therefore amongſt *Strawberries*, ſow here and there ſome *Borrage-Seed*; And you ſhall finde the *Strawberries* under thoſe Leaves farre more large than their Fellowes. And *Bayes* you muſt plant to the *North*; Or defend them from the *Sunne* by a Hedge-Row; And when you ſow the *Berries*, weed not the *Borders*, for the firſt halfe yeare; For the *Weed* giveth them *Shade*. 441

To increaſe the *Crops* of *Plants*, there would be conſidered, not onely the *Increaſing* the *Luſt* of the *Earth*, or of the *Plant*, but the Saving alſo of that which is ſpilt. So they have lately made a Triall, to *Set Wheat*; which nevertheleſſe hath beene left off, becauſe of the trouble and paines; Yet ſo much is true, that there is much ſaved by the *Setting*, in compariſon of that which is *Sowen*; Both by keeping it from being picked up by Birds; And by Avoiding the Shallow lying of it, whereby much that is ſowen taketh no Root. 442

It is preſcribed by ſome of the *Ancients*, that you take *Small Trees*, upon which *Figs* or other *Fruit* grow, being yet unripe, and cover the *Trees* in the Middle of *Autumne* with dung, untill the Spring; And then take them up in a warme day, and replant them in good Ground; And by that meanes, the former yeares *Tree* will be ripe, as by a new Birth; when other *Trees* of the ſame kinde, doe but bloſſome. But this ſeemeth to have no great Probabilitie. 443

It is reported, that if you take *Nitre*, and mingle it with *Water*, to the thickneſſe of *Honey*, and therewith anoint the *Bud*, after the *Vine* is cut, it will ſprout forth within eight dayes. The *Cauſe* is like to be, (if the *Experiment* be true,) the Opening of the *Bud*, and of the Parts Contiguous, by the Spirit of the *Nitre*; For *Nitre* is (as it were) the Life of *Vegetables*. 444

Take *Seed*, or *Kernells*, of *Apples*, *Peares*, *Orenges*; Or a *Peach*, or a *Plum-Stone*, &c. And put them into a *Squill*, (which is like a great *Onion*,) and they will come up much earlier than in the *Earth* it ſelfe: This I conceive to be as a Kinde of *Grafting* in the *Root*; For as the Stocke of a Graft yeeldeth better prepared Nourſhment to the Graft, than the Crude Earth; So the *Squill* doth the like to the *Seed*. And I ſuppoſe the ſame would be done, by *Putting Kernells* into a *Turnip*, or 445

the like; Save that the *Squill* is more Vigorous, and Hot. It may be tried also, with putting *Onion-Seed* into an *Onion Head*, which thereby (perhaps) will bring forth a larger, and earlier *Onion*.

446 The *Pricking* of a *Fruit* in severall places, when it is almost at his Bigness, and before it ripeneth, hath beene practised with successe, to ripen the Fruit more suddenly. Wee see the Example of the *Biting* of *Waspes*, or *Wormes*, upon *Fruit*, whereby it (manifestly) ripeneth the sooner.

447 It is reported, that *Alga Marina* (*Sea-weed*) put under the *Roots* of *Coleworts*, and (perhaps) of other *Plants*, will further their Growth. The vertue (no doubt) hath Relation to *Salt*, which is a great Help to Fertilitie.

448 It hath beene practised, to cut off the Stalks of *Cucumbers*, immediately after their *Bearing*, close by the Earth; And then to cast a prettie Quantitie of Earth upon the *Plant* that remaineth; and they will beare the next yeare Fruit, long before the ordinarie time. The *Cause* may be, for that the Sap goeth downe the sooner, and is not spent in the Stalke or Leafe, which remaineth after the Fruit. Where note, that the *Dying*, in the winter, of the *Roots* of *Plants*, that are *Annuall*, seemeth to be partly caused by the Over-Expence of the Sap into Stalke, and Leaves; which being prevented, they will super-annate, if they stand warme.

449 The *Pulling off* many of the *Blossomes* from a *Fruit-Tree*, doth make the *Fruit* fairer. The *Cause* is manifest; For that the Sap hath the lesse to nourish. And it is a Common Experience, that if you doe not pull off some *Blossomes*, the first time a *Tree* bloometh, it will blossome it selfe to death.

450 It were good to trie, what would be the Effect, if all the *Blossomes* were pulled from a *Fruit-Tree*; Or the *Acornes* and *Chesnut-buds*, &c. from a *Wilde Tree*, for two yeares together. I suppose that the *Tree* will either put forth, the third yeare, bigger, and more plentifull *Fruit*; Or else, the same yeares, larger Leaves, because of the Sap stored up.

451 It hath beene generally received, that a *Plant watered* with *Warme Water*, will come up sooner and better, than with Cold Water, or with Showers. But our *Experiment* of *Watering Wheat* with *Warme Water* (as hath beene said) succeeded not; which may be, because the Triall was too late in the Yeare, *viz.* in the End of *October*. For the Cold then comming upon the *Seed*, after it was made more tender by the Warme Water, might check it.

452 There is no doubt, but that *Grafting* (for the most Part) doth *meliorate* the *Fruit*. The *Cause* is manifest; For that the Nourishment is better prepared in the *Stocke*, than in the *Crude Earth*: But yet note well, that there be some *Trees*, that are said to come up more happily from the *Kernell*, than from the *Graft*; As the *Peach*, and *Melocotone*. The *Cause* I suppose to be, for that those *Plants* require a Nourishment of great Moisture; And though the Nourishment of the *Stocke* be finer,

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and better prepared, yet it is not so moist, and plentifull, as the Nourishment of the *Earth*. And indeed wee see those *Fruits* are verie Cold *Fruits* in their Nature.

453 It hath beene received, that a Smaller *Peare*, grafted upon a *Stocke* that beareth a greater *Peare*, will become Great. But I thinke it is as true, as that of the *Prime-Fruit* upon the *Late Stocke*; And *è converso*; which we rejected before: For the *Cions* will governe. Nevertheless it is probable enough, that if you can get a *Cions* to grow upon a *Stocke* of another kinde, that is much moyster than his owne *Stocke*, it may make the *Fruit* Greater, because it will yeeld more plentifull nourishment; Though it is like it will make the *Fruit* Baser. But generally, the *Grafting* is upon a drier *Stock*; As the *Apple* upon a *Crab*; The *Peare* upon a *Thorne*; &c. Yet it is reported, that in the *Low-Countries* they will graft an *Apple-Cions* upon the *Stocke* of a *Colewort*, and it will beare a great flaggie *Apple*; The *Kernell* of which, if it be set, will be a *Colewort*, and not an *Apple*. It were good to trie, whether an *Apple-Cions* will prosper, if it be grafted upon a *Sallow*, or upon a *Poplar*, or upon an *Alder*, or upon an *Elme*, or upon an *Horse-Plumme*, which are the moysteſt of *Trees*. I have heard that it hath beene tried upon an *Elme*, and succeeded.

454 It is manifest by Experience, that *Flowers* Removed wax greater, because the Nourishment is more easily come by, in the loose Earth. It may be, that Oft Regrafting of the same Cions, may likewise make *Fruit* greater; As if you take a *Cions*, and graft it upon a *Stocke* the first yeare; And then cut it off, and graft it upon another *Stocke* the second yeare; and so for a third; Or fourth yeare; And then let it rest, it will yeeld afterward, when it beareth, the greater *Fruit*.

Of Grafting *there are many* Experiments *worth the Noting, but those wee reserve to a proper Place.*

455 It maketh *Figs* better, if a *Fig-Tree*, when it beginneth to put forth Leaves, have his Top cut off. The *Cause* is plaine, for that the Sap hath the lesse to feed, and the lesse way to mount: But it may be, the *Figge* will come somewhat later, as was formerly touched. The same may be tried likewise in other *Trees*.

456 It is reported, that *Mulberries* will be fairer, and the *Trees* more fruitfull, if you bore the *Truncke* of the *Tree* thorow, in severall places, and thrust into the Places bored, Wedges of some Hot *Trees*, as *Turpentine*, *Mastick-Tree*, *Guaiacum*, *Iuniper*, &c. The *Cause* may be, for that Adventive Heat doth cheare up the Native Iuyce of the *Tree*.

457 It is reported, that *Trees* will grow greater, and beare better *Fruit*, if you put *Salt*, or *Lees* of *Wine*, or *Bloud* to the *Root*. The *Cause* may be the Encreasing the Lust or Spirit of the *Root*; These Things being more forcible, than ordinarie *Composts*.

458 It is reported by one of the Ancients, that *Artichoakes* will be lesse prickly, and more tender, if the *Seeds* have their Tops dulled, or grated off upon a Stone.

459 *Herbs* will be tenderer, and fairer; if you take them out of *Beds*, when they are newly come up, and remove them into *Pots*, with better *Earth*. The Remove from *Bed* to *Bed* was spoken of before; But that was in severall yeares; This is upon the sudden. The *Cause* is the same with other *Removes*, formerly mentioned.

460 *Colewortes* are reported by one of the *Ancients*, to prosper exceedingly, and to be better tasted, if they be sometimes watred with *Salt-Water*; And much more with *Water* mixed with *Nitre*; The Spirit of which is lesse Adurent than *Salt*.

461 It is reported, that *Cucumbers* will prove more Tender, and Daintie, if their *Seeds* be *Steeped* (a little) in *Milke*; The *Cause* may be, for that the *Seed* being mollified with the *Milke*, will be too weake to draw the grosser Iuyce of the Earth, but onely the finer. The same *Experiment* may be made in *Artichoakes*, and other *Seeds*, when you would take away, either their Flashinesse, or Bitternesse. They speake also, that the like Effect followeth, of *Steeping* in *Water* mixed with *Honey*; But that seemeth to me not so probable, because *Honey* hath too quicke a Spirit.

462 It is reported that *Cucumbers* will be lesse *Watrie*, and more *Melon-like*, if in the Pit where you set them, you fill it (halfe way up) with *Chaffe*, or small *Sticks*, and then powre *Earth* upon them; For *Cucumbers*, as it seemeth, doe extremely affect Moisture; And over-drinke themselves; Which this *Chaffe*, or *Chips*, forbiddeth. Nay it is further reported, that if when a *Cucumber* is growne, you set a Pot of water about five or six inches distance from it, it will, in 24. houres, shoot so much out, as to touch the Pot; Which if it be true, it is an *Experiment* of an higher Nature, than belongeth to this *Title*: For it discovereth *Perception* in *Plants*, to move towards that which should help and comfort them, though it be at a distance. The ancient Tradition of the *Vine* is far more strange: It is, that if you set a Stake, or Prop, some distance from it, it will grow that way; Which is farre stranger (as is said) than the other; For that *Water* may worke by a *Sympathy* of *Attraction*: But this of the *Stake* seemeth to be a Reasonable Discourse.

463 It hath beene touched before, that *Terebration* of *Trees* doth make them prosper better. But it is found also, that it maketh the *Fruit* sweeter, and better. The *Cause* is, for that notwithstanding the *Terebration*, they may receive Aliment sufficient; And yet no more than they can well turne, and digest; And withall doe sweat out the coursest and unprofitabl st Iuyce; Even as it is in *Living Creatures*, which by Moderate Feeding, and Exercise, and Sweat, attaine the soundest Habite of Body.

464 As *Terebration* doth *Meliorate Fruit*, so, upon the like reason, doth *Letting* of *Plants Bloud*; As *Pricking Vines*, or other *Trees*, after they be of some Growth; And thereby letting forth *Gumme*, or *Teares*; Though this be not to continue, as it is in *Terebration* but at some Seasons. And it is reported, that by this Artifice, *Bitter Almonds* have beene turned into *Sweet*.

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465 The Ancients for the *Dulcorating* of *Fruit*, doe commend *Swines-Dung* above all other *Dung*; Which may be, becauſe of the Moiſture of that Beaſt, whereby the *Excrement* hath leſſe Acrimony; For wee ſee *Swines* and *Pigges* Fleſh is the Moiſteſt of Fleſhes.

466 It is obſerved by ſome, that all *Herbs* wax ſweeter, both in Smell and Taſte, if after they be growne up ſome reaſonable time, they be cut, and ſo you take the latter Sprout. The *Cauſe* may be for that the longer the Iuyce ſtayeth in the Root, and Stalke, the better it concocteth. For one of the Chiefe Cauſes, why *Graines*, *Seeds*, and *Fruits*, are more Nouriſhing than *Leaves*, is the length of time, in which they grow to *Maturation*. It were not amiſſe to keepe backe the Sap of *Herbs*, or the like, by ſome fit meanes, till the end of Summer; whereby (it may be) they will be more Nouriſhing.

467 As *Grafting* doth generally advance and *Meliorate Fruits*, above that which they would be, if they were ſet of *Kernells*, or *Stones*, in regard the *Nouriſhment* is better concocted; So (no doubt) even in *Grafting*, for the ſame cauſe, the Choyſe of the *Stocke* doth much; Always provided, that it be ſomewhat inferiour to the *Cions*. For otherwiſe it dulleth it. They commend much the *Grafting* of *Peares*, or *Apples*, upon a *Quince*.

468 Beſides the *Meanes* of *Melioration* of *Fruits*, before mentioned, it is ſet downe as tried, that a *Mixture* of *Bran*, and *Swines-Dung*; Or *Chaffe* and *Swines-Dung*; (eſpecially laid up together for a Moneth to rot,) is a verie great Nouriſher, and Comforter to a *Fruit-Tree*.

469 It is delivered, that *Onions* wax greater, if they be taken out of the Earth, and laid a drying twentie dayes, and then ſet againe; And yet more, if the outermoſt Pill be taken off all over.

470 It is delivered by ſome, that if one take the *Bough* of a *Low Fruit-tree*, newly budded, and draw it gently, without hurting it, into an *Earthen* Pot perforate at the bottome to let in the *Plant*, and then Cover the *Pot* with Earth, it will yeeld a verie large *Fruit*, within the Ground. Which *Experiment* is Nothing but *Potting* of *Plants*, without Removing, and Leaving the *Fruit* in the Earth. The like, (they ſay,) will be effected, by an Emptie *Pot* without Earth in it, put over a *Fruit*, being propped up with a *Stake*, as it hangeth upon the *Tree*; And the better, if ſome few Pertuſions be made in the *Pot*. Wherein, beſides the Defending of the *Fruit*, from Extremitie of Sunne or Weather, ſome give a reaſon, that the *Fruit*, Loving and Coveting the open Aire and Sunne, is invited by thoſe Pertuſions, to ſpread and approch, as neare the open Aire, as it can; And ſo enlargeth in *Magnitude*.

471 All *Trees*, in *High* and *Sandy Grounds*, are to be ſet deepe; And in *Watry Grounds*, more ſhallow. And in all *Trees*, when they be removed (eſpecially *Fruit-Trees*) care ought to be taken, that the Sides of the *Trees* be coaſted, (*North* and *South*, &c.) as they ſtood before. The ſame is ſaid alſo of *Stone* out of the *Quarry*, to make it more durable; Though that

ſeemeth

seemeth to have lesse reason; Because the *Stone* lyeth not so neare the Sunne, as the *Tree* groweth.

472 *Timber Trees* in a *Coppice Wood*, doe grow better, than in an *Open Field*; Both because, they offer not to spread so much, but shoot up still in Height; And chiefly because they are defended from too much Sun and Wind, which doe checke the Growth of all *Fruit*; And so (no doubt) *Fruit-Trees*, or *Vines*, set upon a *Wall*, against the Sunne, betweene Elbowes or Buttresses of Stone, ripen more, than upon a Plaine Wall.

473 It is said, that if *Potado Roots*, be set in a *Pot* filled with Earth, and then the *Pot* with Earth be set likewise within the Ground, some two or three Inches, the *Roots* will grow greater, than Ordinarie. The *Cause* may be, for that Having Earth enough within the *Pot* to nourish them; And then being stopped by the Bottom of the *Pot* from putting Strings downward, they must needs grow greater in Breadth, and Thicknesse. And it may be, that all *Seeds* or *Roots*, *Potted*, and so set into the *Earth*, will prosper the better.

474 The *Cutting off* the *Leaves* of *Radish*, or other *Roots*, in the beginning of Winter, before they wither; And Covering againe the *Root*, something high with Earth; Will preserve the *Root* all Winter, and make it bigger, in the Spring following, as hath beene partly touched before. So that there is a double Vse of this *Cutting off* the *Leaves*: For in *Plants*, where the *Root* is the *Esculent*, as *Radish*, and *Parsnips*, it will make the *Root* the greater: And so it will doe to the *Heads* of *Onions*. And where the *Fruit* is the *Esculent*, by Strengthning the *Root*, it will make the *Fruit* also the greater.

475 It is an *Experiment* of great pleasure, to make the *Leaves* of *Shadie Trees*, larger than ordinarie. It hath beene tried (for certaine) that a *Cions* of a *Weech-Elme*, grafted upon the Stocke of an Ordinarie *Elme*, will put forth Leaves, almost as broad as the Brimme of ones Hat. And it is verie likely, that as in *Fruit-Trees*, the *Graft* maketh a greater *Fruit*; So in *Trees* that beare no *Fruit*, it will make the greater *Leaves*. It would be tried therefore in *Trees* of that kinde chiefly; As *Birch*, *Asp*, *Willow*; And especially the *Shining Willow*, which they call *Swallow-Taile*, because of the pleasure of the Leafe.

476 The *Barrennesse* of *Trees*, by *Accident*, (besides the *Weakenesse* of the *Soile*, *Seed*, or Root; And the *Injurie* of the *Weather*) commeth either of their *Over-growing* with *Mosse*; Or their being *Hide-bound*; Or their *Planting too deepe*; Or by *Issuing* of the *Sap too much into the Leaves*. For all these there are *Remedies* mentioned before.

Experiments in Consort touching *Compound Fruits* and *Flowers*.

Wee see that in *Living Creatures*, that have *Male* and *Female*, there is Copulation of severall Kindes; and so *Compound Creatures*; As the *Mule*, that is generated betwixt the *Horse* and the *Asse*; And some other *Compounds*, which we call *Monsters*,

sters, though more rare: And it is held, that that *Proverbe*, *Africa semper aliquid Monstri parit*; commeth, for that the Fountaines of Waters there, being rare, divers Sorts of Beasts come from severall Parts to drinke; And so being refreshed, fall to couple, and many times with severall Kinds. The *Compounding* or *Mixture* of *Kinds* in *Plants* is not found out; Which nevertheless, if it be possible, is more at command, than that of *living Creatures*; For that their Lust requireth a voluntarie Motion: wherefore it were One of the most Noble *Experiments* touching *Plants*, to finde it out: For so you may have great Varietie of New *Fruits*, and *Flowers* yet unknowne. *Grafting* doth it not: That mendeth the *Fruit*, or doubleth the *Flowers*, &c. But it hath not the Power to make a *New Kinde*. For the *Cions* ever over-ruleth the *Stocke*.

It hath beene set downe by one of the *Ancients*, that if you take two *Twigs* of severall *Fruit Trees*, and flat them on the Sides, and then binde them close together, and set them in the ground, they will come up in one Stock; But yet they will put forth their severall *Fruits*, without any *Commixture* in the *Fruit*. Wherein note (by the way) that *Vnitie* of *Continuance*, is easier to procure, than *Vnitie* of *Species*. It is reported also that *Vines* of *Red* and *White Grapes*, being set in the Ground, and the upper Parts being flatted, and bound close together, will put forth *Grapes* of the severall Colours, upon the same Branch; And *Grape-Stones* of severall Colours within the same *Grape*: But the more, after a yeare or two; The Unitie (as it seemeth) growing more Perfect. And this will likewise help, if from the first *Vniting*, they be often Watred; For all Moisture helpeth to *Vnion*. And it is prescribed also, to binde the *Bud*, as soone as it commeth forth, as well as the *Stocke*; At the least for a time. 477

They report, that divers *Seeds*, put into a *Clout*, and laid in Earth well dunged, will put up *Plants Contiguous*; Which (afterwards) being bound in, their *Shoots* will *Incorporate*. The like is said of *Kernels*, put into a *Bottle*, with a Narrow Mouth, filled with Earth. 478

It is reported, that young *Trees* of severall kindes, set contiguous, without any binding, and verie often Watred, in a *Fruitfull Ground*, with the verie Luxurie of the *Trees*, will incorporate, and grow together. Which seemeth to me the likeliest Meanes, that hath beene propounded; For that the *Binding* doth hinder the Naturall Swelling of the *Tree*; which, while it is in Motion, doth better *unite*. 479

Experiments in Consort touching the *Sympathy* and *Antipathy* of *Plants*.

There are many Ancient and Received Traditions and Observations, touching the *Sympathy* & *Antipathy* of *Plants*: For

For that ſome will thrive beſt growing neere others; which they impute to *Sympathy*: And ſome worſe; which they impute to *Antipathy*. But theſe are Idle and Ignorant Conceits; And forſake the true *Indication* of the *Cauſes*; As the moſt Part of *Experiments*, that concerne *Sympathies* and *Antipathies* doe. For as to *Plants*, neither is there any ſuch Secret *Friendſhip*, or *Hatred*, as they imagine; And if we ſhould be content to call it *Sympathy*, and *Antipathy*, it is utterly miſtaken; For their *Sympathy* is an *Antipathy*, and their *Antipathy* is a *Sympathy*: For it is thus; Whereſoever one *Plant* draweth ſuch a particular Iuyce out of the Earth; as it qualifieth the Earth; So as that Iuyce which remaineth is fit for the other Plant, there the Neighbourhood doth good; Becauſe the Nouriſhments are contrarie, or ſeverall: But where two *Plants* draw (much) the ſame Iuyce, there the Neighbourhood hurteth; For the one deceiveth the other.

480 Firſt therefore, all *Plants* that doe draw much *Nouriſhment* from the *Earth*, and ſo ſoake the Earth, and exhauſt it; hurt all Things that grow by them; As Great *Trees*, (eſpecially *Aſhes*,) and ſuch *Trees*, as ſpread their *Roots*, neere the Top of the Ground. So the *Colewort* is not an Enemy (though that were anciently received) to the *Vine* only; But it is an Enemie to any other *Plant*; Becauſe it draweth ſtrongly the fatteſt Iuyce of the Earth. And if it be true, that the *Vine*, when it creepeth neere the *Colewort*, will turne away; This may be, becauſe there it findeth worſe Nouriſhment; For though the *Root* be where it was, yet (I doubt) the *Plant* will bend as it nouriſheth.

481 Where *Plants* are of ſeverall Natures, and draw ſeverall Iuyces out of the Earth, there (as hath beene ſaid) the One ſet by the other helpeth: As it is ſet downe by divers of the Ancients, that *Rew* doth proſper much, and becommeth ſtronger, if it be ſet by a *Figge-Tree*: which (we conceive) is cauſed, Not by Reaſon of *Frindſhip*, but by *Extraction* of a Contrarie Iuyce: The one Drawing *Iuyce* fit to reſult Sweet, the other bitter. So they have ſet downe likewiſe, that a *Roſe* ſet by *Garlick* is ſweeter: Which likewiſe may be, becauſe the more Fetide Iuyce of the Earth goeth into the *Garlick*: And the more Odorate into the *Roſe*.

482 This wee ſee manifeſtly, that there be certaine *Corne-Flowers*, which come ſeldome or never in other places, unleſſe they be ſet; But onely amongſt Corne: As the *Blew-Bottle*, a kinde of *Yellow Mary-Gold Wilde Poppy*, and *Fumitorie*. Neither can this be, by Reaſon of the Culture of the Ground, by Plowing, or Furrowing; As ſome *Herbs*, and *Flowers*, will grow but in *Ditches* new Caſt; For if the *Ground* lie fallow, and unſowne, they will not come: So as it ſhould ſeeme to be the *Corne*,

that

that qualifieth the Earth, and prepareth it for their Growth.

483 This Observation, if it holdeth, (as it is verie probable,) is of great use, for the *Meliorating* of *Taste* in *Fruits*, and *Esculent Herbs*; And of the *Sent* of *Flowers*. For I doe not doubt, but if the *Figge-Tree* doe make the *Rew* more strong, and bitter, (as the Ancients have noted,) good store of *Rew* planted about the *Figge-Tree*, will make the *Figge* more sweet. Now the *Tastes* that doe most offend in *Fruits*, and *Herbs*, and *Roots*, are *Bitter*; *Harrish*, *Sowre*; And *Watrish*, or *Flashie*. It were good therefore to make the *Trials* following.

484 Take *Wormewood*, or *Rew*, and set it neere *Lettuce*, or *Coleflorie*, or *Artichoake*; And see whether the *Lettuce*, or the *Coleflorie*, &c. become not the sweeter.

485 Take a *Service-Tree*, or a *Cornelian-Tree*, or an *Elder-Tree*, which we know have *Fruits* of harsh and binding Iuyce, and set them neere a *Vine*, or *Figge-Tree*, & see whether the *Grapes*, or *Figs*, will not be the sweeter.

486 Take *Cucumbers*, or *Pumpions*, and set them (here and there) amongst *Muske-Melons*, and see whether the *Melons* will not be more Winy, and better tasted. Set *Cucumbers* (likewise) amongst *Radish*, and see whether the *Radish* will not be made the more Biting.

487 Take *Sorrell*, and set it amongst *Rasps*, and see whether the *Rasps* will not be the sweeter.

488 Take *Common Briar*, and set it amongst *Violets*, or *Wall-Flowers*, and see whether it will not make the *Violets*, or *Wall-Flowers* sweeter, and lesse Earthy in their Smell. So set *Lettuce*, or *Cucumbers*, amongst *Rosemary*, or *Bayes*, and see whether the *Rosemary*, or *Bayes*, will not be the more Odorate, or Aromaticall.

489 Contrariwise, you must take heed, how you set *Herbs* together, that draw much the like Iuyce. And therefore I thinke *Rosemary* will leese in Sweetnesse, if it be set with *Lavender*, or *Bayes*, or the like. But yet, if you will correct the strength of an Herb, you shall doe well to set other like Herbs by him, to take him downe; And if you should set *Tansey* by *Angelica*, it may be, the *Angelica* would be the weaker, and fitter for Mixture in Perfume. And if you should set *Rew* by *Common Wormewood*, it may be, the *Wormewood* would turne to be liker *Roman Wormewood*.

490 This *Axiome* is of large extent; And therefore would be severed, and refined by *Triall*. Neither must you expect to have a *Grosse Difference* by this kinde of Culture, but only *Further Perfection*.

491 Triall would be also made in *Herbs Poysonous*, and *Purgative*, whose ill Qualitie (perhaps) may be discharged, or attempred, by Setting stronger *Poysons*, or *Purgatives*, by them.

492 It is reported, that the *Shrub* called *Our Ladies Seale*; (which is a Kinde of *Briony*,) and *Coleworts*, set neere together, one or both will die. The *Cause* is, for that they be both great Depredatours of the Earth, and one of them starveth the other. The like is said of a *Reed*, and a *Brake*; Both which are succulent; And therefore the One deceiveth

ceiveth the Other. And the like of *Hemlock* and *Rew*; Both which draw ſtrong Iuyces.

493 Some of the Ancients, and likewiſe divers of the Moderne Writers, that have laboured in *Naturall Magick*, have noted a *Sympathy*, between the *Sunne*, *Moone*, and ſome Principall *Starres*; And certaine *Herbs*, and *Plants*. And ſo they have denominated ſome *Herbs Solar*, and ſome *Lunar*; And ſuch like Toyes put into great Words. It is manifeſt, that there are ſome *Flowers*, that have *Reſpect* to the *Sunne*, in two *Kindes*; The one by *Opening* and *Shutting*; And the other by *Bowing* and *Inclining* the *Head*. For *Mary-golds*, *Tulippa's*, *Pimpernell*, and indeed moſt *Flowers*, doe open or ſpread their Leaves abroad, when the *Sunne* ſhineth ſerene and faire: And againe, (in ſome part,) cloſe them, or gather them inward, either towards Night, or when the Skie is overcaſt. Of this there needeth no ſuch Solemne Reaſon to be aſſigned; As to ſay, that they rejoyce at the preſence of the Sunne; And mourne at the Abſence thereof. For it is Nothing elſe, but a little Loading of the Leaves, and Swelling them at the Bottome, with the Moiſture of the Aire; whereas the drie Aire doth extend them: And they make it a Peece of the wonder, that *Garden Claver* will hide the *Stalke*, when the *Sunne* ſheweth bright; Which is Nothing, but a full Expanſion of the leaves. For the *Bowing* and *Inclining* the *Head*; it is found in the great *Flower* of the *Sunne*; in *Mary-golds*; *Wart-wort*; *Mallow Flowers*; and others. The *Cauſe* is ſomewhat more Obſcure than the former; But I take it to be no other, but that the Part againſt which the *Sunne* beateth, waxeth more faint and flaccide in the Stalke, And thereby leſſe able to ſupport the *Flower*.

494 What a little *Moiſture* will doe in *Vegetables*, even though they be dead, and ſevered from the Earth, appeareth well in the *Experiment* of *Iuglers*. They take the *Beard* of an *Oate*; which (if you marke it well,) is wreathed at the Bottom, and one ſmooth entire Straw at the Top. They take onely the Part that is Wreathed, and cut off the other, leaving the *Beard* halfe the Breadth of a finger in length. Then they make a little *Croſſe* of a *Quill*, long wayes of that Part of the *Quill*, which hath the Pith; And Croſſe-wayes of that Peece of the *Quill* without Pith; The whole *Croſſe* being the Breadth of a Finger high. Then they pricke the Bottome where the *Pith* is, and thereinto they put the *Oaten-beard*, leaving halfe of it ſticking forth of the *Quill*: Then they take a little white Box of wood, to deceive Men, as if ſomewhat in the Box did worke the Feat: In which, with a Pinne, they make a little Hole, enough to take the *Beard*, but not to let the *Croſſe* ſinke downe, but to ſticke. Then likewiſe by way of Impoſture, they make a Queſtion; As, Who is the Faireſt Woman in the Company? Or, Who hath a Glove, or Card? And cauſe Another to name divers Perſons: And upon everie Naming, they ſticke the *Croſſe* in the Box, having firſt put it towards their Mouth, as if they charmed it; And the *Croſſe* ſtirreth not; But when they come to the Perſon that they would take; As they hold the *Croſſe* to their Mouth,

they

they touch the *Beard* with the Tip of their Tongue, and wet it; And so sticke the *Crosse* in the Box; And then you shall see it turne finely and softly, three or foure Turnes; Which is caused by the untwining of the *Beard* by the Moisture. You may see it more evidently, if you sticke the Crosse betweene your fingers, in stead of the Box; And therefore you may see, that this Motion, which is Effected by so little Wet, is stronger than the Closing or Bending of the Head of a *Marigold*.

It is reported by some, that the *Herb* called *Rosa-Solis*, (whereof they make Strong Waters,) will at the Noone-day, when the *Sunne* shineth hot and bright, have a great Dew upon it. And therefore, that the right Name is *Ros Solis*: which they impute to a Delight and *Sympathy*, that it hath with the Sunne. Men favour Wonders. It were good first to be sure, that the Dew that is found upon it, bee not the Dew of the Morning Preserved, when the Dew of other *Herbs* is breathed away; for it hath a smooth and thicke Leafe, that doth not discharge the Dew so soone, as other *Herbs* that are more Spungy and Porous. And it may bee Purslane, or some other Herb, doth the like, and is not marked. But if it bee so, that it hath more Dew at Noone, than in the Morning, then sure it seemeth to be an Exudation of the *Herb* it selfe. As Plums sweat when they are set into the Oven: for you will not (I hope) thinke, that it is like *Gedeons Fleece* of *Woull*, that the *Dew* should fall upon that, and no where else. 495

It is certaine, that the *Honey-dewes*, are found more upon *Oake-leaves*, than upon *Ash*, or *Beech*, or the like: But whether any *Cause* be, from the *Leafe* it selfe, to concoct the Dew; Or whether it bee onely, that the *Leafe* is Close and Smooth; (And therefore drinketh not in the Dew, but preserveth it;) may be doubted. It would be well inquired, whether *Manna* the *Drug*, doth fall but upon certaine *Herbs* or *Leaves* onely. *Flowers* that have deepe *Sockets*, doe gather in the Bottome, a kinde of *Honey*; As *Honey-Suckles*; (both the *Woodbine*, and the *Trifoile*;) *Lillies*; and the like. And in them certainly the *Flower* beareth part with the *Dew*. 496

The Experience is, that the *Froth*, which they call *Woodesare*, (being like a kinde of Spittle,) is found but upon certaine *Herbs*, and those Hot Ones; As *Lavender*, *Lavender-cotton*, *Sage*, *Hissope*, &c. Of the *Cause* of this enquire further; For it seemeth a Secret. There falleth also *Mildew* upon *Corne*, and smutteth it; But it may bee, that the same falleth also upon other *Herbs*, and is not observed. 497

It were good, Triall were made, whether the great Consent betweene *Plants* and *Water*, which is a principall Nourishment of them, will make an *Attraction* or Distance, and not at Touch only. Therefore take a *Vessell*, and in the middle of it make a false Bottome of course Canvasse: Fill it with Earth above the Canvasse, and let not the Earth bee watred; Then sow some good *Seeds* in that Earth; But under the Canvasse, some halfe a foot in the Bottome of the Vessell, lay a great *Spunge*, thorowly wet in water; And let it lye so some ten Dayes; And 498

see whether the *Seeds* will sprout, and the *Earth* become more Moist, & the *Spunge* more dry. The *Experiment* formerly mentioned of the *Cucumber*, creeping to the Pot of Water, is far stranger than this.

Experiments in Consort, touching the *Making Herbs* and *Fruits Medicinable.*

THe *Altering* of the *Sent*, *Colour*, or *Taste* of *Fruit*, by *Infusing*, *Mixing*, or *Letting* into the *Barke*, or *Root* of the *Tree*, *Herb*, or *Flower*, any *Coloured*, *Aromaticall*, or *Medicinall* Substance; are but *Fancies*. The *Cause* is, for that those Things have passed their Period, and nouriſh not. And all *Alteration* of Vegetables, in those Qualities; must be by somewhat, 499 that is apt to goe into the Nouriſhment of the *Plant*. But this is true; that where *Kine* feed upon *Wilde Garlicke*, their *Milke* tasteth plainly of the *Garlicke*: And the Fleſh of *Muttons* is better tasted where the *Sheepe* feed upon *Wilde Thyme*, and other wholesome *Herbs*. *Galen* also speaketh of the Curing of the *Scirrus* of the *Liver*, by *Milke* of a *Cow*, that feedeth but upon certaine *Herbs*; And *Honey* in *Spaine* smelleth (apparently) of the *Rosemary*, or *Orenge*, from whence the *Bee* gathereth it: And there is an old Tradition of a *Mayden* that was fed with *Napellus*; (which is counted the Strongeſt Poyson of all *Vegetables*;) which with use did not hurt the *Maid*, but poiſoned some that had Carnall Company with her. So it is observed by some, that there is a vertuous *Bezoar*, and another without vertue; which appeare to the ſhew alike; But the Vertuous is taken from the Beaſt, that feedeth upon the Mountaines, where there are *Theriacall Herbs*; And that without Vertue, from those that feed in the Valleys, where no such *Herbs* are. Thus far I am of Opinion; That as Steeped Wines and Beeres, are very *Medicinall*; and likewise Bread tempred with divers Powders; So of *Meat* also, (as *Fleſh*, *Fiſh*, *Milke*, and *Egges*,) that they may bee made of great use for *Medicine*, and *Diet*, if the *Beaſt*, *Foule*, or *Fiſh*, be fed with a speciall kinde of food, fit for the Diſeaſe. It were a dangerous Thing also for secret Empoysonments. But whether it may be applyed unto *Plants*, and *Herbs*, I doubt more; Becauſe the Nouriſhment of them is a more common Juyce; which is hardly capable of any speciall Quality, untill the *Plant* doe assimilate it.

500 But leſt our Incredulity may prejudice any profitable Operations in this kind, (eſpecially ſince Many of the Ancients have ſet them down,) We thinke good briefly to propound the foure *Meanes*, which they have deviſed of Making *Plants Medicinable*. The Firſt is by *Slitting* of the *Root*, and *Infusing* into it the *Medicine*; As *Hellebore*, *Opium*, *Scammony*, *Triacle*, &c. And then binding it up againe. This seemeth to me the leaſt probable; Becauſe the *Root* draweth immediately from the Earth; And ſo the Nouriſhment is the more Common, and leſſe Qualified: And beſides, it is a long time in Going up, ere it come to the *Fruit*. The Second Way is, to *Perforate* the *Body* of the *Tree*, and there to *Infuſe* the *Medicine*: Which is somewhat better: For if any Vertue bee received from the *Medicine*, it hath the leſſe way, and the leſſe time, to goe up. The Third is, the *Steeping* of the *Seed* or *Kernell* in some *Liquour*, where-

in

in the *Medicine* is *Infused*: Which I have little Opinion of, because the *Seed*, (I doubt,) will not draw the Parts of the *Matter*, which have the *Propriety*: But it will bee farre the more likely, if you mingle the *Medicine* with *Dung*; For that the *Seed* naturally drawing the *Moisture* of the *Dung*, may call in withall some of the *Propriety*. The fourth is, the *Watering* of the *Plant oft*, with an *Infusion* of the *Medicine*. This, in one respect, may have more force than the rest; Because the *Medication* is oft renewed; Whereas the rest are applyed but at one time: And therefore the Vertue may the sooner vanish. But still I doubt, that the *Root* is somewhat too stubborne to receive those fine *Impressions*; And besides, (as I said before,) they have a great *Hill* to goe up. I judge therefore the likeliest way to bee the *Perforation* of the *Body* of the *Tree*, in *severall places, one above the other*; And the *Filling* of the *Holes* with *Dung mingled with the Medicine*. And the *Watring* of those *Lumps* of *Dung*, with Squirts of an *Infusion* of the *Medicine* in *Dunged water*, once in three or foure Daies.

Century V.

NATVRALL HISTORIE.

VI. Century.

OVR *Experiments* we take care to be, (as we have often ſaid,) either *Experimenta Fructifera*, or *Lucifera*; Either of *Vſe*, or of *Diſcovery*: For wee hate *Impoſtures*; And deſpiſe *Curioſities*. Yet becauſe wee muſt apply our Selves ſomwhat to Others, wee will ſet downe ſome *Curioſities* touching *Plants*.

Experiments in Conſort, touching *Curioſities* about *Fruits* and *Plants*.

501 It is a *Curioſity*, to have *ſeverall Fruits* upon *one Tree*; And the more, when ſome of them come *Earely*, and ſome come *Late*; So that you may have, upon the ſame *Tree*, Ripe *Fruits* all Sommer. This is eaſily done, by Grafting of ſeverall *Cions*, upon ſeverall Boughes, of a Stock, in a good Ground, plentifully fed. So you may have all Kindes of *Cherries*, and all kindes of *Plums*, and *Peaches*, and *Apricots*, upon one *Tree*; But I conceive the *Diverſity* of *Fruits* muſt be ſuch, as will graft upon the ſame Stocke. And therefore I doubt, whether you can have *Apples*, or *Peares*, or *Orenges*, upon the ſame Stocke, upon which you graft *Plummes*.

502 It is a *Curioſity* to have *Fruits* of *Divers Shapes*, and *Figures*. This is eaſily performed by Moulding them, when the *Fruit* is young, with Moulds of Earth, or Wood. So you may have *Cucumbers*, &c. as Long

as a Cane; Or as round as a Spheare; Or formed like a Crosse. You may have also *Apples*, in the forme of *Peares*, or *Limons*. You may have also *Fruit* in more Accurate Figures; As we said of *Men*, *Beasts*, or *Birds*, according as you make the Moulds. Wherein you must understand, that you make the Mould big enough, to containe the whole *Fruit*, when it is growne to the greatest: For else you will choake the Spreading of the *Fruit*; Which otherwise would spread it selfe, and fill the Concave, and so bee turned into the *Shape* desired; As it is in Mould workes of Liquid Things. Some doubt may bee conceived, that the Keeping of the Sunne from the *Fruit*, may hurt it: But there is ordinary experience of *Fruit* that groweth Covered. *Quære* also, whether some small Holes, may not be made in the Wood, to let in the Sunne. And note, that it were best to make the Moulds partible, glued, or cemented together, that you may open them, when you take out the *Fruit*.

503 It is a *Curiosity*, to have *Inscriptions*, or *Engravings*, in *Fruit*, or *Trees*. This is easily performed, by *Writing* with a *Needle*, or *Bodkin*, or *Knife*, or the like, when the *Fruit*, or *Trees* are young; For as they grow, so the Letters will grow more large, and Graphicall.

——Teneriſq; meos incidere Amores
Arboribus, creſcent illæ, creſcetis Amores.

504 You may have *Trees apparrelled* with *Flowers*, or *Herbs*, by *Boring Holes* in the *Bodies* of them, and Putting into them *Earth holpen* with *Mucke*, and *Setting Seeds*, or *Slips*, of *Violets*, *Strawberries*, *Wilde-Thyme*, *Camomill*, and such like in the *Earth*. Wherein they doe but grow, in the *Tree*, as they doe in *Pots*; Though (perhaps) with some Feeding from the *Trees*. It would be tried also with *Shoots* of *Vines*, and *Roots* of *Red-Roses*; For it may bee, they being of a more Ligneous Nature, will incorporate with the *Tree* it selfe.

505 It is an ordinary *Curiosity*, to *Forme Trees* and *Shrubs*, (as *Rosemary*, *Iuniper*, and the like,) into *Sundry Shapes*; which is done by Moulding them within, and Cutting them without. But they are but lame Things, being too small to keepe Figure: Great *Castles* made of *Trees* upon Frames of Timber, with Turrets, and Arches, were anciently matters of Magnificence.

506 Amongst *Curiosities*, I shall place *Colouration*, though it be somewhat better: For *Beauty* in *Flowers* is their Preheminence. It is observed by some, that *Gilly-flowers*, *Sweet-Williams*, *Violets*, that are *Coloured*, if they be neglected, and neither Watred, nor New Moulded, nor Transplanted, will turne *White*. And it is probable, that the *White* with much culture, may turne *Coloured*. For this is certaine, that the *White Colour* commeth of Scarcity of Nourishment; Except in Flowers that are onely *White*, and admit no other *Colours*.

507 It is good therefore, to see what *Natures* doe accompany what *Colours*; For by that you shall have Light, how to induce *Colours*, by Producing those *Natures*. *Whites* are more Inodorate, (for the most part,) than

than *Flowers* of the same kinde *Coloured*; As is found in *Single White Violets*, *White-Roses*, *White Gilly-Flowers*, *White Stock-Gilly-Flowers*, &c. Wee finde also, that *Blossomes* of *Trees*, that are *White*, are commonly Inodorate, As *Cherries*, *Peares*, *Plummes*; Whereas those of *Apples*, *Crabs*, *Almonds*, and *Peaches*, are Blushy, and Smell sweet. The *Cause* is, for that the Substance that Maketh the *Flower*, is of the thinnest and finest of the *Plant*; Which also maketh *Flowers* to bee of so dainty *Colours*. And if it be too Sparing, and Thinne, it attaineth no Strength of Odour; Except it bee in such *Plants*, as are very Succulent; Whereby they need rather to bee scanted in their Nourishment, than replenished, to have them sweet. As wee see in *White Satyrion*, which is of a Dainty Smell; And in *Beane-Flowers*, &c. And againe, if the *Plant* bee of Nature, to put forth *White Flowers* onely, and those not thinne, or dry, they are commonly of rancke and fulsome Smell; As *May-Flowers*, and *White Lillies*.

Contrariwise, in *Berries*, the *White* is commonly more Delicate, and Sweet in Taste, than the *Coloured*; As wee see in *white Grapes*; In *White Raspes*; In *White Strawberries*; In *White Currans*, &c. The *Cause* is, for that the *Coloured* are more juyced, and courser juyced; And therefore not so well and equally Concocted; But the *White* are better proportioned, to the Disgestion of the *Plant*. 508

But in *Fruits*, the *White* commonly is meaner; As in *Peare-Plums*, *Damasins*, &c. And the Choicest *Plummes* are Blacke; The *Mulberry*, (which though they call it a *Berry*, is a *Fruit*,) is better the *Blacke*, than the *White*. The *Harvest White-Plumme*, is a base *Plumme*; And the *Verdoccio* and *white Date-Plumme*, are no very good *Plummes*. The *Cause* is, for that they are all Over-watry: Whereas an higher Concoction is required for Sweetnesse, or Pleasure of Taste; And therefore all your dainty *Plummes*, are a little dry, and come from the Stone; As the *Muscle-Plumme*, the *Damasin-Plumme*, the *Peach*, the *Apricot*, &c. Yet some *Fruits*, which grow not to bee *Blacke*, are of the Nature of *Berries*, sweetest such as are Paler; As the *Cœur-Cherry*, which inclineth more to *White*, is sweeter than the *Red*; But the *Egriot* is more sowre. 509

Take *Gilly-Flower Seed*, of one kinde of *Gilly-Flower*: (As of the *Clove-Gilly-Flower*, which is the most Common;) And sow it; And there will come up *Gilly-Flowers*, some of one *Colour*, and some of another, casually, as the *Seed* meeteth with Nourishment in the Earth; So that the *Gardiners* finde, that they may have two or three *Roots* amongst an hundred, that are rare, and of great Price: As *Purple*, *Carnation* of severall *Stripes*; The *Cause* is, (no doubt,) that in *Earth*, though it bee contiguous, and in one Bed, there are very severall *Iuyces*; And as the *Seed* doth casually meet with them, so it commeth forth. And it is noted especially, that those which doe come up *Purple*, doe alwayes come up Single; The *Iuyce*, as it seemeth, not being able to suffice a *Succulent Colour*, and a *Double Leafe*. This *Experiment* of severall *Colours*, 510

lours, comming up from one *Seed*, would bee tried alſo in *Larkes-Foot*, *Monkes-Hood*, *Poppy*, and *Hollyoke*.

511 Few *Fruits* are coloured *Red* within; The *Queene-Apple* is; And another *Apple*, called the *Roſe-Apple*; *Mulberries* likewiſe; and *Grapes*, though moſt toward the Skinne. There is a *Peach* alſo, that hath a Circle of *Red* towards the Stone: And the *Egriot-Cherry* is ſomewhat *Red* within; But no *Peare*, nor *Warden*, nor *Plumme*, nor *Apricot*, although they have (many times) *Red* ſides, are Coloured *Red* within. The *Cauſe* may bee enquired.

512 The generall *Colour* of *Plants* is *Greene*; which is a *Colour* that no *Flower* is of. There is a *Greeniſh Prime-Roſe*, but it is *Pale*, and ſcarce a *Greene*; The *Leaves* of ſome *Trees* turne a little *Murry*, or *Reddiſh*; And they be commonly *Young Leaves* that doe ſo; As it is in *Oakes*, and *Vines*, and *Haſle*. *Leaves* rot into a *Yellow*; And ſome *Hollies* have part of their *Leaves Yellow*, that are, (to all ſeeming,) as Freſh and Shining, as the *Greene*. I ſuppoſe alſo, that *Yellow* is a leſſe Succulent *Colour*, than *Greene*; And a degree nearer *White*. For it hath beene noted, that thoſe *Yellow Leaves* of *Holly* ſtand ever towards the *North*, or *North-Eaſt*. Some *Roots* are *Yellow*, as *Carrets*; And ſome *Plants Bloud-Red*, Stalke and Leafe, and all; as *Amaranthus*. Some *Herbes* incline to *Purple*, and *Red*; As a Kinde of *Sage* doth, and a Kinde of *Mint*, and *Roſa Solis*, &c. And ſome have *White Leaves*, as another Kinde of *Sage*, and another Kinde of *Mint*; But *Azure*, and a *Faire Purple*, are never found in *Leaves*. This ſheweth, that *Flowers* are made of a Refined Juyce, of the Earth; And ſo are *Fruits*: But *Leaves* of a more Courſe, and Common.

513 It is a *Curioſity* alſo to make *Flowers Double*; Which is effected by *Often Removing* them into *New Earth*; As on the contrary Part, *Double Flowers*, by neglecting, and not Removing, prove *Single*. And the Way to doe it ſpeedily, is to ſow or ſet *Seeds*, or *Slips* of *Flowers*; And as ſoone as they come up, to remove them into new Ground, that is good. Enquire alſo, whether *Inoculating* of *Flowers*, (as *Stock-Gilly-Flowers*, *Roſes*, *Muske-Roſes*, &c.) doth not make them *Double*. There is a *Cherry-Tree*, that hath *Double Bloſſomes*: But that *Tree* beareth no *Fruit*; And, it may bee, that the ſame Meanes, which applied to the *Tree*, doth extremely accelerate the Sap to riſe, and Breake forth; Would make the *Tree* ſpend it ſelfe in *Flowers*, and thoſe to become *Double*; Which were a great pleaſure to ſee; Eſpecially in *Apple-Trees*, *Peach-Trees*, and *Almond-Trees*, that have *Bloſſomes Bluſh-Coloured*.

514 The *Making* of *Fruits*, without *Core* or *Stone*, is likewiſe a *Curioſity*; And ſomewhat better: Becauſe whatſoever maketh them ſo, is like to make them more Tender and Delicate. If a *Cions* or *Shoot*, fit to be ſet in the Ground, have the *Pith* finely taken forth, (and not altogether, but ſome of it left, the better to ſave the life,) it will beare a *Fruit* with little, or no *Core*, or *Stone*. And the like is ſaid to bee, of dividing a *Quicke-Tree*, downe to the Ground, and Taking out the *Pith*, and then binding it up againe.

It

It is reported also, that a *Citron* grafted upon a *Quince*, will have small or no *Seeds*; And it is very probable, that any *Sowre Fruit*, grafted upon a *Stocke*, that beareth a *Sweeter Fruit*, may both make the *Fruit* sweeter, and more void of the harsh Matter of *Kernells* or *Seeds*. 515

It is reported, that not only the *Taking out* of the *Pith*, but the *Stopping* of the *Iuyce* of the *Pith*, from Rising in the Middest, and *Turning* it to rise on the Outside, will make the *Fruit* without *Core*, or *Stone*; As if you should boare a *Tree* cleane thorow, and put a wedge in. It is true, there is some Affinitie betweene the *Pith* and the *Kernell*, because they are both of a harsh Substance, and both placed in the Middest. 516

It is reported that *Trees watred* perpetually with *Warme Water*, will make a *Fruit*, with little or no *Core* or *Stone*. And the Rule is generall, that whatsoever will make a *Wilde-Tree* a *Garden-Tree*, will make a *Garden-Tree* to have lesse *Core*, or *Stone*. 517

Experiments in Consort, touching the *Degenerating* of *Plants*; And of the *Transmutation* of them, one into another.

THe Rule is certaine, that *Plants* for want of Culture, *degenerate* to be baser in the same Kinde; And sometimes so farre, as to change into another Kinde. 1. The *Standing long*, and not being *Removed*, maketh them *degenerate*. 2. *Drought*, unlesse the Earth of it selfe be moist, doth the like. 3. So doth *Removing into worse Earth*, or *Forbearing to compost the Earth*; As wee see that *Water-Mint* turneth into *Field Mint*; And the *Colewort* into *Rape* by Neglect, &c. 518

Whatsoever *Fruit* useth to bee set upon a *Root*, or a *slip*, if it bee *sowne*, will *degenerate*. *Grapes sowne*; *Figs*, *Almonds*, *Pomgranate Kernells sowne*; make the *Fruits degenerate*, and become Wilde. And againe, Most of those *Fruits* that use to bee *grafted*, if they be set of *Kernells*, or *Stones*, *degenerate*. It is true, that *Peaches*, (as hath beene touched before,) doe better upon *Stones Set*, than upon *Grafting*: And the Rule of Exception should seeme to bee this; That whatsoever *Plant* requireth much Moisture, prospereth better upon the *Stone*, or *Kernell*, than upon the *Graft*. For the Stocke, though it giveth a finer Nourishment, yet it giveth a scanter, than the Earth at large. 519

Seeds, if they bee very *old*, and yet have strength enough to bring forth a *Plant*, make the *Plant degenerate*. And therefore skilfull Gardiners make triall of the *Seeds*, before they buy them, whether they be good or no, by Putting them into Water gently Boyled; And if they be good, they will sprout within halfe an Houre. 520

It is strange which is reported, that *Basill* too much exposed to the *Sunne*, doth turne into *Wilde Time*: Although those two *Herbes* seeme to have small Affinitie; but *Basill* is almost the only Hot *Herbe*, that hath Fat and Succulent *Leaves*; Which Oylinesse, if it bee drawne forth by the Sunne, it is like it will make a very great Change. 521

There is an old Tradition, that *Boughs of Oake*, put into the Earth, will put forth *wilde Vines*: Which if it be true, (no doubt,) it is not the *Oake* that turneth into a *Vine*, but the *Oake-Bough* Putrifying, qualifieth the Earth, to put forth a *Vine* of it selfe. 522

523 It is not impossible, and I have heard it verified, that upon *Cutting downe* of an Old *Timber-Tree*, the *Stub* hath put out sometimes a *Tree* of another Kinde; As that *Beech* hath put forth *Birch*; Which, if it bee true, the *Cause* may be, for that the old *Stub* is too scant of Juyce, to put forth the former *Tree*; And therefore putteth forth a *Tree* of a smaller kinde, that needeth lesse Nourishment.

524 There is an Opinion in the Countrey, that if the same *Ground* be *oft sowen*, with the *Graine* that *grew upon it*, it will, in the end, grow to be of a baser kinde.

525 It is certaine, that in very *Sterile Yeares*, *Carne sowne* will grow to an *Other Kinde*.

Grandia sæpè quibus mandavimus Hordea Sulcis,
Infœlix Lolium, & steriles dominantur Avenæ.

And generally it is a Rule, that *Plants*, that are brought forth by *Culture*, as *Corne*, will sooner change into other *Species*, than those that come of themselves: For that *Culture* giveth but an Adventitious Nature, which is more easily put off.

This worke of the *Transmutation* of *Plants*, one into another, is *inter Magnalia Naturæ*: For the *Transmutation* of *Species* is, in the vulgar philosophie, pronounced Impossible: And certainly, it is a thing of difficultie, and requireth deepe Search into Nature: But seeing there appeare some manifest *Instances* of it, the Opinion of Impossibilitie is to be rejected; And the Meanes thereof to bee found out. Wee see, that in *Living Creatures*, that come of *Putrefaction*, there is much *Transmutation*, of one into another; As *Catterpillers* turne into *Flies*, &c. And it should seeme probable, that whatsoever *Creature*, having life, is generated without *Seed*, that *Creature* will change out of one *Species* into another. For it is the *Seed*, and the Nature of it, which locketh and boundeth in the *Creature*, that it doth not expatiate. So as we may well conclude, that seeing the Earth, of it selfe, doth put forth *Plants*, without *Seed*, therfore *Plants* may well have a *Transmigration* of *Species*. Wherefore wanting *Instances*, which doe occurre, wee shall give Directions of the most likely *Trialls*: And generally, wee would not have those, that read this our Work of *Sylva Sylvarum*, account it strange, or think that it is an Over-Haste, that wee have set downe Particulars untried; For contrariwise, in our owne Estimation, we account such Particulars, more worthy, than those that are al-

ready tried and knowne. For these Later must bee taken as you finde them; But the Other doe levell Point blanke at the *Inventing* of *Causes*, and *Axiomes*.

First therefore you must make account, that if you will have one *Plant* change into another, you must have the *Nourishment* over-rule the *Seed*; And therefore you are to practise it by *Nourishments* as contrary, as may be, to the *Nature* of the *Herbe*; So nevertheless as the *Herbe* may grow; And likewise with *Seeds* that are of the Weakest Sort, and have least Vigour. You shall doe well therefore, to take *Marsh-Herbs*, and Plant them upon Tops of Hills, and Champaignes; And such *Plants* as require much Moisture, upon Sandy and very drie Grounds. As for Example, *Marsh-Mallowes*, and *Sedge*, upon Hills; *Cucumber* and *Lettuce-Seeds*, and *Coleworts*, upon a *Sandy Plot*: So contrariwise plant *Bushes*, *Heath*, *Ling*, and *Brakes*, upon a *Wet* or *Marsh Ground*. This I conceive also, that all *Esculent* and *Garden-Herbs*, set upon the Tops of Hills, will prove more *Medicinall*, though lesse *Esculent*, than they were before. And it may be likewise, some *Wilde-Herbs* you may make *Sallet-Herbs*. This is the first Rule for *Transmutation* of *Plants*. 526

The second Rule shall bee to burie some few *Seeds*, of the *Herbe* you would change, amongst other *Seeds*; And then you shall see, whether the Juyce of those other *Seeds*, doe not so qualifie the Earth, as it will alter the *Seed*, whereupon you worke. As for Example; Put *Parsly-Seed* amongst *Onion-Seed*; Or *Lettuce-Seed* amongst *Parsley-Seed*; Or *Basill-Seed* amongst *Thyme-Seed*; And see the Change of Taste, or otherwise. But you shall doe well, to put the *Seed* you would change, into a little linnen Cloth, that it mingle not with the forraine *Seed*. 527

The third Rule shall bee, the *Making* of some *Medley* or *Mixture* of *Earth*, with some other *Plants Bruised*, or *Shaven*, either in *Leafe* or *Root*: As for Example, make *Earth* with a *Mixture* of *Colewort-Leaves*, stamped, and set in it *Artichoakes*, or *Parsnips*; So take *Earth* made with *Majoram*, or *Origanum*, or *Wilde-Thyme*, bruised, or stamped, and set in it *Fennell-Seed*, &c. In which Operation, the Processe of Nature still will bee, (as I conceive,) not that the *Herbe* you worke upon, should draw the Juyce of the Forrain *Herbe*; (For that Opinion wee have formerly rejected;) But that there will bee a New Confection of Mould, which perhaps will alter the *Seed*, and yet not to the kinde of the former *Herbe*. 528

The fourth Rule shall be, to marke what *Herbs*, *some Earths doe put forth of themselves*; And to take that *Earth*, and to *Pot* it, or to *Vessell* it; And in that to set the *Seed* you would change: As for example, take from under Walls, or the like, where *Nettles* put forth in abundance, the Earth which you shall there finde, without any *String*, or *Root* of the *Nettles*; And Pot that *Earth*, and set in it *Stock-gilly-flowers*, or *Wall-Flowers*, &c. Or sow in the *Seeds* of them; And see what the Event will be: Or take *Earth*, that you have prepared to put forth *Mush-* 529

roomes,

romes, of it selfe, (whereof you shall finde some *Instances* following;) And sow in it *Purslane-seed*, or *Lettuce-Seed*; for in these *Experiments*, it is likely enough, that the *Earth* being accustomed to send forth one Kinde of Nourishment, will alter the new *Seed*.

530 The fifth Rule shall be, to make the *Herbe grow Contrary to his Nature*; As to make *Ground-Herbes* rise in *Heighth*: As for example; Carry *Camomill*, or *Wilde-Thyme*, or the *Greene-Strawberry*, upon Sticks, as you doe *Hops* upon Poles; And see what the Event will bee.

531 The sixth Rule shall be, to make *Plants grow out of the Sunne, or open Aire*; For that is a great Mutation in Nature; And may induce a Change in the *Seed*: As barrell up *Earth*, and sow some *Seed* in it, and put in the Bottome of a Pond; Or put it in some great hollow *Tree*; Trie also the Sowing of *Seeds*, in the Bottomes of Caves; And Pots with *Seeds* sowne, hanged up in Wells, some distance from the Water, and see what the Event will be.

Experiments in Consort touching the *Proceritie*, and *Lownesse*, and *Artificiall dwarfing* of *Trees*.

IT is certaine, that *Timber-Trees* in *Coppice-woods*, grow more upright, and more free from Under-Boughs, than those that stand in the *Field*: The *Cause* whereof is, for that *Plants* have a Naturall Motion, to get to the Sunne; And besides, they are not glutted with too much Nourishment; For that the *Coppice* shareth with them; And Repletion ever hindreth Stature; Lastly, they are kept warme; And that ever in *Plants* helpeth Mounting.

532

533 *Trees*, that are, of themselves, full of *Heat*, (which *Heat* appeareth by their *Inflammable Gums*,) as *Firrs*, and *Pines*, mount of themselves in Heighth without Side-Boughs, till they come towards the Top. The *Cause* is, partly Heat; And partly Tenuitie of Juyce; Both which send the Sap upwards. As for *Iuniper*; it is but a *Shrub*, and groweth not bigge enough in Body, to maintaine a tall *Tree*.

534 It is reported, that a Good Strong *Canvas*, spread over a *Tree* grafted low, soone after it putteth forth, will *dwarfe* it, and make it spread. The *Cause* is plaine; For that all Things that grow, will grow as they finde Roome.

535 *Trees* are generally set of *Roots*, or *Kernells*; But if you set them of *Slips*, (as of some *Trees* you may, by name the *Mulberry*,) some of the *Slips* will take; And those that take, (as is reported,) will bee *Dwarfe-Trees*. The *Cause* is, for that a *Slip* draweth Nourishment more weakly, than either a *Root*, or *Kernell*.

536 All *Plants*, that put forth their *Sap* hastily, have their Bodies not proportionable to their Length, And therefore they are *winders*, and *Creepers*; As *Ivy*, *Briony*, *Hops*, *Woodbine*: Whereas *Dwarfing* requireth a slow Putting forth, and lesse Vigour of Mounting.

Experiments in Consort, touching the

The *Scripture* saith, that *Salomon* wrote a *Naturall History*, from the *Cedar* of *Libanus*, to the *Mosse growing upon the Wall*:

For

For so the best *Translations* have it. And it is true that *Mosse* is but the *Rudiment* of a *Plant*; And (as it were) the *Mould* of *Earth*, or *Barke*.

Rudiments of *Plants*, and of the Excrescences of *Plants*, or *Super-Plants*.

537 *Mosse* groweth chiefly upon *Ridges* of *Houses*, tiled or thatched; And vpon the *Crests* of *Walls*. And that *Mosse* is of a lightsome, and pleasant Greene. The Growing upon *Slopes* is caused, for that *Mosse*, as one the one side it commeth of Moisture and Water, so on the other side the *Water* must but Slide, and not Stand or Poole. And the *Growing* upon *Tiles*, or *Walls*, &c. is caused, for that those dried Earths, having not Moisture sufficient to put forth a *Plant*, doe practise *Germination* by Putting forth *Mosse*; Though when by Age, or otherwise, they grow to relent and resolve, they sometimes put forth *Plants*; As *Wall-Flowers*. And almost all *Mosse* hath here and there little Stalkes, besides the low Thrumme.

538 *Mosse* groweth upon *Alleyes*, especially such as lye Cold, and upon the North; As in divers Tarrasses: And againe, if they be much trodden; Or if they were, at the first, gravelled; For wheresoever *Plants* are kept downe, the Earth putteth forth *Mosse*.

539 *Old Ground*, that hath beene long unbroken up, gathereth *Mosse*: And therfore Husbandmen use to cure their *Pasture Grounds*, when they grow to *Mosse*, by Tilling them for a yeare, or two: Which also dependeth upon the same *Cause*; For that, the more Sparing and Starving Iuyce of the Earth, insufficient for *Plants*, doth breed *Mosse*.

540 *Old Trees* are more *Mossie*, (farre) than *Young*; For that the Sap is not so frank as to rise all to the Boughes, but tireth by the way, and putteth out *Mosse*.

541 *Fountaines* have *Mosse* growing upon the *Ground* about them;

Muscosi Fontes; ——————

The *Cause* is, for that the *Fountaines* draine the *Water* from the *Ground Adjacent*, and leave but sufficient Moisture to breed *Mosse*: And besides, the *Coldnesse* of the *Water* conduceth to the same.

542 The *Mosse* of *Trees*, is a kinde of *Haire*; For it is the Iuyce of the *Tree*, that is Excerned, and doth not Assimilate. And upon great *Trees* the *Mosse* gathereth a Figure, like a *Leafe*.

543 The *Moister Sort* of *Trees* yeeld little *Mosse*; As wee see in *Asps*, *Poplars*, *Willowes*, *Beeches*, &c. Which is partly caused, for the Reason that hath beene given, of the francke Putting up of the *Sap* into the *Boughs*; And partly, for that the *Barks* of those *Trees*, are more Close and Smooth, than those of *Oakes*, and *Ashes*; Whereby the *Mosse* can the hardlier issue out.

544 In *Clay-Grounds*, all *Fruit-Trees* grow full of *Mosse*, both upon *Body* and *Boughs*; Which is caused, partly by the *Coldnesse* of the *Ground*, whereby the *Plants* nourish lesse; And partly by the *Toughnesse* of the *Earth*, whereby the *Sap* is shut in, and cannot get up, to spread so franckly, as it should doe.

545 Wee have ſaid heretofore, that if *Trees* be *Hide-bound*, they wax leſſe Fruitfull, and gather *Moſſe*: And that they are holpen by *Hacking*, &c. And therefore by the Reaſon of Contraries, if *Trees* be bound in with *Cords*, or ſome Outward *Bands*, they will put forth more *Moſſe*: Which (I thinke) happeneth to *Trees* that ſtand Bleake, and upon the Cold Winds. It would alſo be tried, whether, if you cover a *Tree*, ſomewhat thick upon the top, after his Powling, it will not gather more *Moſſe*. I thinke alſo, the *Watring* of *Trees* with *Cold Fountaine-Water*, will make them grow full of *Moſſe*.

546 There is a *Moſſe* the *Perfumers* have, which commeth out of *Apple-Trees*, that hath an Excellent Sent. *Quære* particularly for the *Manner* of the *Growth*, and the *Nature* of it. And for this *Experiments* ſake, being a Thing of Price, I have ſet downe the laſt *Experiments*, how to multiply, and call on *Moſſes*.

Next unto *Moſſe*, I will ſpeake of *Muſhromes*; Which are likewiſe an *Vnperfect Plant*. Theſe *Muſhromes* have two ſtrange *Properties*; The One, that they yeeld ſo *Delicious* a *Meat*; The other, that they *come up* ſo *haſtily*; As in a *Night*; And yet they are *Vnſowne*. And therefore, ſuch as are Upſtarts in State, they call, in reproch, *Muſhromes*. It muſt needs be therefore, that they be made of much *Moiſture*; And that *Moiſture* Fat, Groſſe, and yet ſomewhat Concocted. And (indeed) we finde, that *Muſhromes* cauſe the *Accident*, which we call *Incubus*, or the *Mare*, in the *Stomacke*. And therefore the *Surfet* of them may Suffocate, and Empoyſon. And this ſheweth, that they are Windy; And that Windineſſe is Groſſe, and Swelling; Not Sharp, or Griping. And upon the ſame reaſon *Muſhromes* are a venereous Meat.

547 It is reported, that the *Barke* of *White*, or *Red Poplar*, (which are of the Moiſteſt of *Trees*,) cut ſmall, and caſt into *Furrowes* well dunged, will cauſe the Ground to put forth *Muſhromes*, at all *Seaſons* of the *Yeare*, fit to be eaten. Some adde to the Mixture *Leaven* of *Bread*, reſolved in *Water*.

548 It is reported, that if a *Hilly-Field*, where the *Stubble* is ſtanding, be ſet on *Fire*, in a *Showrie Seaſon*, it will put forth great Store of *Muſhromes*.

549 It is reported, that *Harts-Horne*, *Shaven*, or in *Small Peeces*, mixed with *Dung*, and *watred*, putteth up *Muſhromes*. And wee know *Harts-Horne* is of a Fat and Clammie Subſtance: And it may be *Oxe-Horne* would doe the like.

550 It hath beene reported, though it be ſcarce credible, that *Ivy* hath growne out of a *Stags-Horne*; Which they ſuppoſe, did rather come from

from a *Confrication* of the *Horne* upon the *Ivy*, than from the *Horne* it selfe. There is not knowne any Substance, but *Earth*, and the *Procedures* of *Earth*, (as *Tile*, *Stone*, &c.) that yeeldeth any *Mosse*, or *Herby Substance*. There may be Triall made of some *Seeds*, as that of *Fennell-Seed*, *Mustard-Seed*, and *Rape-Seed*, put into some little *Holes*, made in the *Hornes* of *Stags*, or *Oxen*, to see if they will grow.

There is also another *Vnperfect Plant*, that (in shew) is like a great *Mushrome*: And it is sometimes as broad as ones Hat; Which they call a *Toads-Stoole*: But it is not Esculent; And it groweth (commonly) by a dead Stub of a *Tree*; And likewise about the *Roots* of *Rotten Trees*: And therefore seemeth to take his Iuyce from *Wood Putrified*. Which sheweth, by the way, that *Wood Putrified* yeeldeth a franke *Moisture*. 551

There is a *Cake*, that groweth upon the Side of a *Dead Tree*, that hath gotten no Name, but it is large, and of a Chesnut Colour, and hard, and pithy; Whereby it should seeme, that even *Dead Trees* forget not their Putting forth; No more than the *Carcasses* of *Mens Bodies*, that put forth *Haire*, and *Nailes*, for a Time. 552

There is a *Cod*, or *Bag*, that groweth commonly in the *Fields*; That at the first is hard like a *Tennis-Ball*, and white; And after groweth of a *Mushrome Colour*, and full of light *Dust* upon the Breaking: And is thought to be dangerous for the *Eyes*, if the *Powder* get into them; And to be good for *Kibes*. Belike it hath a *Corrosive*, and *Fretting Nature*. 553

There is an *Herb* called *Iewes-Eare*, that groweth upon the *Roots*, and *Lower Parts* of the *Bodies* of *Trees*; Especially of *Elders*, and sometimes *Ashes*. It hath a strange Propertie; For in *Warme water*, it swelleth, and openeth extremely. It is not greene, but of a duskie browne Colour. And it is used for *Squinancies*, and *Inflammations* in the *Throat*; Whereby it seemeth to have a Mollifying, and Lenifying Vertue. 554

There is a Kinde of *Spongie Excrescence*, which groweth chiefly upon the *Roots* of the *Laser-Tree*; And sometimes upon *Cedar*, and other *Trees*. It is verie White, and Light, and Friable: Which wee call *Agarick*. It is famous in *Physicke* for the *Purging* of *Tough flegme*. And it is also an excellent *Opener* for the *Liver*: But Offensive to the *Stomack*; And in *Taste* it is, at the first, *Sweet*, and after *Bitter*. 555

We finde no *Super-Plant*, that is a Formed *Plant*, but *Misseltoe*. They have an idle Tradition, that there is a *Bird*, called a *Missel-Bird*, that feedeth upon a *Seed*, which many times shee cannot digest, and so expelleth it whole with her Excrement: which falling upon a *Bough* of a *Tree*, that hath some Rift, putteth forth the *Misseltoe*. But this is a Fable: For it is not probable, that *Birds* should feed upon that they cannot digest. But allow that, yet it cannot be for other Reasons: For First, it is found but upon certaine *Trees*; And those *Trees* beare no such *Fruit*, as may allure that *Bird* to sit, and feed upon them. It may be, that *Bird* feedeth upon the *Misseltoe-Berries*, and so is often found there; Which may have given occasion to the Tale. But that which maketh an End of the Que- 556

stion, is, that *Misseltoe* hath beene found to put forth under the *Boughes*, and not (onely) above the *Boughes:* So it cannot be any Thing that falleth upon the *Bough*. *Misseltoe* groweth chiefly upon *Crab-Trees*, *Apple-Trees*, sometimes upon *Hasles*; And rarely upon *Oakes*; The *Misseltoe* whereof is counted verie *Medicinall*. It is ever greene, Winter and Summer; And beareth a *White Glistering Berry:* And it is a *Plant*, utterly differing from the *Plant*, upon which it groweth. Two things therefore may be certainly set downe: First, that *Super-fætation* must be by *Abundance* of *Sap*, in the *Bough* that putteth it forth: Secondly, that that *Sap* must be such, as the *Tree* doth excerne, and cannot assimilate; For else it would goe into a *Bough*; And besides, it seemeth to be more Fat and Unctuous, than the Ordinary *Sap* of the *Tree*; Both by the *Berry*, which is Clammie; And by that it continueth greene, Winter and Summer, which the *Tree* doth not.

557 This *Experiment* of *Misseltoe* may give Light to other Practices. Therefore Triall would be made, by Ripping of the *Bough* of a *Crab-Tree*, in the *Barke*; And *Watring* of the Wound everie Day, with *warme Water Dunged*, to see if it would bring forth *Misseltoe*, or any such like Thing. But it were yet more likely to trie it, with some other *Watring*, or *Anointing*, that were not so Naturall to the *Tree*, as *Water* is; As *Oyle*, or *Barme* of *Drinke*, &c. So they be such Things as kill not the *Bough*.

558 It were good to trie, what *Plants* would put forth, if they be forbidden to put forth their *Naturall Boughes:* Poll therefore a *Tree*, and cover it, some thickneſſe, with *Clay* on the Top; And see what it will put forth. I suppose it will put forth *Roots*; For so will a *Cions*, being turned downe into *Clay:* Therefore, in this *Experiment* also, the *Tree* would be closed with somewhat, that is not so Naturall to the *Plant*, as *Clay* is. Trie it with *Leather*, or *Cloth*, or *Painting*, so it be not hurtfull to the *Tree*. And it is certaine, that a *Brake* hath beene knowne to grow out of a *Pollard*.

559 A Man may count the *Prickles* of *Trees* to be a kinde of *Excrescence*; For they will never be *Boughes*, nor beare *Leaves*. The *Plants* that have *Prickles*, are *Thornes*, blacke and white; *Brier*; *Rose*; *Limon-Trees*; *Crab-Trees*; *Goose-Berry*; *Berbery*; These have it in the *Bough*; The *Plants* that have *Prickles* in the *Leafe*, are; *Holly*; *Iuniper*; *Whin-bush*; *Thistle*; *Nettles* also have a small Venomous *Prickle*; So hath *Borrage*, but harmelesse. The *Cause* must be *Hastie Putting forth*; *Want* of *Moisture*; And the *Closeneſſe* of the *Barke*; For the *Haste* of the *Spirit to put forth*, and the *Want* of *Nourishment* to put forth a *Bough*, and the *Closeneſſe* of the *Barke*, cause *Prickles* in *Boughes*; And therefore they are ever like a *Pyramis*, for that the *Moisture* spendeth after a little Putting forth. And for *Prickles* in *Leaves*, they come also of *Putting forth more Iuyce* into the *Leafe*, than can spread in the *Leafe* smooth; And therfore the *Leaves* otherwise are *Rough*, as *Borrage* and *Nettles* are. As for the *Leaves* of *Holly*, they are *Smooth*, but never *Plaine*, but as it were with *Folds*, for the same *Cause*.

There

There be also *Plants*, that though they have no *Prickles*, yet they have a Kinde of *Downy* or *Velvet Rine*, upon their *Leaves*; As *Rose-Campion*, *Stock Gilly-Flowers*, *Colts-Foot*; which *Downe* or *Nap* commeth of a *Subtill Spirit*, in a *Soft* or *Fat Substance*. For it is certaine, that both *Stock-Gilly-Flowers*, and *Rose-Campions*, stamped, have beene applied, (with successe,) to the *Wrests* of those that have had *Tertian*, or *Quartan Agues*; And the *Vapour* of *Colts-Foot* hath a Sanative vertue, towards the *Lungs*; And the *Leafe* also is *Healing* in *Surgerie*. 560

Another Kinde of *Excrescence* is an *Exudation* of *Plants*, joyned with *Putrefaction*; As we see in *Oake-Apples*, which are found chiefly upon the *Leaves* of *Oakes*; And the like upon *Willowes*: And Countrey People have a kinde of *Prediction*, that if the *Oake-Apple*, broken, be full of *wormes*, it is a Signe of a *Pestilent Yeare*; Which is a likely Thing, because they grow of Corruption. 561

There is also upon *Sweet*, or other *Brier*, a fine *Tuft*, or *Brush* of *Mosse*, of divers Colours; Which if you cut, you shall ever finde full of little white *Wormes*. 562

IT is certaine, that *Earth* taken out of the *Foundations* of *Vaults* and *Houses*, and *Bottomes* of *Wells*, and then put into *Pots*, will put forth Sundrie Kindes of *Herbs*: But some *Time* is required, for the *Germination*; For if it be taken, but from a *Fathome* deepe, it will put forth the *First Yeare*; If much deeper, not till after a *Yeare*, or *Two*. 563

Experiments in Consort, touching the *Producing* of *Perfect Plants* without *Seed*.

The *Nature* of the *Plants* growing out of *Earth* so taken up, doth follow the *Nature* of the *Mould* it selfe; As if the *Mould* be *Soft*, and Fine, it putteth forth Soft *Herbs*; As *Grasse*, *Plantine*, and the like; If the *Earth* be Harder and Courser, it putteth forth *Herbs* more *Rough*, as *Thistles*, *Firres*, &c. 564

It is Common *Experience*, that where *Alleyes* are close *Gravelled*, the *Earth* putteth forth, the first yeare, *Knot-grasse*, and after *Spire-grasse*. The *Cause* is, for that the *Hard Gravell*, or *Pebble* at the first Laying, will not suffer the *Grasse* to come forth upright, but turneth it to finde his way where it can; But after that the *Earth* is somewhat loosened at the Top, the Ordinarie *Grasse* commeth up. 565

It is reported, that *Earth*, being taken out of *Shady* and *Watry Woods*, some depth, and Potted, will put forth *Herbs* of a Fat and Iuycie Substance; As *Penny-wort*, *Purslane*, *Housleeke*, *Penny-royall*, &c. 566

The *Water* also doth send forth *Plants*, that have no *Roots* fixed in the Bottome; But they are lesse *Perfect Plants*, being almost but *Leaves*, and those Small ones: Such is that wee call *Duck-Weed*; Which hath a *Leafe* no bigger than a *Thyme-Leafe*, but of a fresher Greene, and putteth forth a little *String* into the *Water*, farre from the *Bottome*. As for the *Water-Lilly*, it hath a *Root* in the *Ground*: And so have a Number of other *Herbs* that grow in *Ponds*. 567

It is reported by some of the *Ancients*, and some *Moderne Testimonie* likewise, that there be some *Plants*, that grow upon the Top of the *Sea*; 568

Being ſuppoſed to grow of ſome *Concretion* of *Slime* from the *Water*, where the *Sunne* beateth hot, and where the *Sea* ſtirreth little. As for *Alga Marina*, (*Sea-weed*,) and *Eryngium* (*Sea-Thiſtle*,) both have *Roots*; but the *Sea-weed* under the *Water*, the *Sea-Thiſtle* but upon the *Shore*.

569 The Ancients have noted, that there are ſome *Herbs*, that grow out of *Snow*, laid up cloſe together, and *Putrified*; And that they are all *Bitter*; And they name one ſpecially, *Flomus*, which wee call *Moth-Mullein*. It is certaine, that *Wormes* are found in *Snow* commonly, like *Earth-Wormes*; And therefore it is not unlike, that it may likewiſe put forth *Plants*.

570 The *Ancients* have affirmed, that there are ſome *Herbs*, that grow out of *Stone*; Which may be, for that it is certaine, that *Toads* have been found in the Middle of a Free-Stone. We ſee alſo, that *Flints*, lying above *Ground*, gather *Moſſe*; And *Wall-Flowers*, and ſome other *Flowers*, grow upon *Walls*; But whether upon the Maine *Bricke*, or *Stone*, or whether out of the *Lime*, or *Chincks*, is not well obſerved; For *Elders* and *Aſhes* have beene ſeene to grow out of *Steeples*: But they manifeſtly grow out of *Clefts*; In ſo much as when they grow big, they will diſjoyne the *Stone*. And beſides it is doubtfull, whether the *Mortar* it ſelfe putteth it forth, or whether ſome *Seeds* be not let fall by *Birds*. There be likewiſe *Rock-Herbs*; But I ſuppoſe thoſe are, where there is ſome *Mould* or *Earth*. It hath likewiſe beene found, that great *Trees* growing upon *Quarries*, have put downe their *Root* into the *Stone*.

571 In ſome *Mines* in *Germany*, as is reported, there grow in the Bottome *Vegetables*; And the *Worke-Folks* uſe to ſay, they have *Magicall Vertue*; And will not ſuffer men to gather them.

572 The *Sea-Sands* ſeldome beare *Plants*. Whereof the *Cauſe* is yeelded, by ſome of the *Ancients*, for that the *Sunne* exhaleth the *Moiſture*, before it can incorporate with the *Earth*, and yeeld a Nouriſhment for the *Plant*. And it is affirmed alſo, that Sand hath (alwayes) his *Root* in *Clay*; And that there be no Veines of *Sand*, any great depth within the *Earth*.

573 It is certaine, that ſome *Plants* put forth for a time, of their owne *Store*, without any *Nouriſhment* from *Earth*, *Water*, *Stone*, &c. Of which *Vide* the *Experiment* 29.

Experiments in Conſort touching *Forraine Plants*.

574 IT is reported, that *Earth*, that was brought out of the *Indies*, and other *Remote Countries*, for *Ballaſt* of *Ships*, caſt upon ſome *Grounds* in *Italy*, did put forth *Forraine Herbs*, to us in *Europe* not knowne; And, that which is more, that of their *Roots*, *Barks*, and *Seeds*, contuſed together, and mingled with other *Earth*, and well Watred with *Warme Water*, there came forth *Herbs*, much like the Other.

575 *Plants* brought out of *Hot Countries*, will endevour to put forth, at the ſame *Time*, that they uſually do in their owne *Climate*; And therfore to preſerve them, there is no more required, than to keepe them from the Injurie of Putting back by *Cold*. It is reported alſo, that *Graine* out

of

of the *Hotter Countries* tranſlated into the *Colder*, will be more forward, than the Ordinarie *Graine* of the *Cold Countrey*. It is likely, that this will prove better in *Graines*, than in *Trees*; For that *Graines* are but *Annuall*; and ſo the *Vertue* of the *Seed* is not worne out; Whereas in a *Tree*, it is embaſed by the *Ground*, to which it is Removed.

576 Many *Plants*, which grow in the *Hotter Countries*; being ſet in the *Colder*, will nevertheleſſe, even in thoſe *Cold Countries*, being ſowne of *Seeds* late in the *Spring*, come up and abide moſt Part of the *Summer*; As wee finde it in *Orenge*, and *Limon-Seeds*, &c. The *Seeds* whereof, Sowen in the End of *Aprill*, will bring forth Excellent *Sallets*, mingled with other *Herbs*. And I doubt not, but the *Seeds* of *Clove-Trees*, and *Pepper-Seeds*, &c. if they could come hither *Greene* enough to be ſowen, would doe the like.

Experiments in Conſort, touching the *Seaſons* in which *Plants* come forth.

577 THere be ſome *Flowers*, *Bloſſomes*, *Graines*, and *Fruits*, which come more *Early*; And Others which come more *Late* in the Yeare. The *Flowers* that come early, with us, are; *Prime-Roſes*, *Violets*, *Anemonies*, *Water-Daffadillies*, *Crocus Vernus*, and ſome early *Tulippa's*. And they are all *Cold Plants*; Which therefore, (as it ſhould ſeeme,) have a quicker *Perception*, of the *Heat* of the *Sunne* Increaſing, than the *Hot Herbs* have; As a *Cold Hand* will ſooner finde a little *Warmth*, than a *Hot*. And thoſe that come next after, are *Wall-Flowers*, *Cowſlips*, *Hyacinths*, *Roſemary-Flowers*, &c. And after them, *Pincks*, *Roſes*, *Flowerdeluces*, &c. And the lateſt are *Gilly-Flowers*, *Holly-oakes*, *Larkes-Foot*, &c. The Earlieſt *Bloſſomes* are, the *Bloſſomes* of *Peaches*; *Almonds*, *Cornelians*, *Mezerions*, &c. And they are of ſuch *Trees*, as have much *Moiſture*, either *Watrie*, or *Oylie*. And therefore *Crocus Vernus* alſo, being an *Herb*, that hath an *Oylie Iuyce*, putteth forth early. For thoſe alſo finde the *Sunne* ſooner than the *Drier Trees*. The *Graines* are, firſt *Rye* and *Wheat*; Then *Oats* and *Barley*; Then *Peaſe* and *Beanes*. For though Greene *Peaſe* and *Beanes* be eaten ſooner, yet the Drie Ones, that are uſed for *Horſe-Meat*, are ripe laſt; And it ſeemeth that the Fatter *Graine* commeth firſt. The Earlieſt *Fruits* are, *Strawberries*, *Cherries*, *Gooſeberries*, *Corrans*; And after them *Early Apples*, *Early Peares*, *Apricots*, *Raſps*; And after them *Damaſins*, and moſt Kinde of *Plums*, *Peaches*, &c. And the lateſt are *Apples*, *Wardens*, *Grapes*, *Nuts*, *Quinces*, *Almonds*, *Sloes*, *Brier-Berries*, *Hefs*, *Medlars*, *Services*, *Cornelians*, &c.

578 It is to be noted, that (commonly) *Trees* that *ripen lateſt*, *bloſſome ſooneſt*: As *Peaches*, *Cornelians*, *Sloes*, *Almonds*, &c. And it ſeemeth to be a Worke of Providence, that they bloſſome ſo ſoone; For otherwiſe, they could not have the *Sunne* long enough to ripen.

579 There be Fruits, (but rarely,) that come *twice a Yeare*; as ſome *Peares*, *Strawberries*, &c. And it ſeemeth they are ſuch, as abound with Nouriſhment; Whereby after one Period, before the *Sunne* waxeth too weake, they can endure another. The *Violet* alſo, amongſt *Flowers*, commeth twice a Yeare; Eſpecially the *Double White*; And that alſo

is

is a *Plant* full of Moisture. *Roses* come twice, but it is not without *Cutting*, as hath beene formerly said.

580 In *Muscovia*, though the *Corne* come not up, till late *Spring*, yet their *Harvest* is as Early as Ours. The *Cause* is, for that the *Strength* of the *Ground* is kept in with the *Snow*; And wee see with us, that if it be a long *Winter*, it is commonly a more *Plentifull Yeare*: And after those kinde of *winters* likewise, the *Flowers*, and *Corne*, which are Earlier, and Later, doe come commonly at once, and at the same time; Which troubleth the *Husbandman* many times; For you shall have *Red Roses*, and *Damaske Roses*, come together; And likewise the *Harvest* of *wheat* and *Barley*. But this happeneth ever, for that the Earlier stayeth for the Later; And not that the Later commeth sooner.

581 There be divers *Fruit-Trees*, in the *Hot Countries*, which have *Blossomes*, and *Young Fruit*, and *Ripe Fruit*, almost all the Yeare, succeeding one another. And it is said, the *Orenge* hath the like with us, for a great Part of Summer; And so also hath the *Figge*. And no doubt, the *Naturall Motion* of *Plants*, is to have so; But that either they want *Iuyce* to spend; Or they meet with the *Cold* of the Winter: And therefore this *Circle* of *Ripening* cannot be, but in *Succulent Plants*, and *Hot Countries*.

582 Some *Herbs* are but *Annuall*, and die, *Root* and all, once a Yeare; As *Borrage*, *Lettuce*, *Cucumbers*, *Muske-Melons*, *Basill*, *Tobacco*, *Mustard-Seed*, and all kindes of *Corne*; Some continue many Yeares; As *Hyssope*, *Germander*, *Lavander*, *Fennell*, &c. The *Cause* of the *Dying* is double; The first is the *Tendernesse* and *Weakenesse* of the *Seed*, which maketh the Period in a small time; As it is in *Borrage*, *Lettuce*, *Cucumbers*, *Corne*, &c. And therefore none of these are Hot. The other *Cause* is, for that some *Herbs* can worse endure *Cold*; As *Basill*, *Tobacco*, *Mustard-Seed*. And these have (all) much *Heat*.

Experiments in Consort touching the *Lasting* of *Herbs* and *Trees*.

583 THe *Lasting* of *Plants* is most in those that are *Largest* of *Body*; As *Oakes*, *Elme*, *Chest-Nut*, the *Loat-Tree*, &c. And this holdeth in *Trees*; But in *Herbs* it is often contrarie; For *Borage*, *Colewort*, *Pompions*, which are *Herbs* of the *Largest Size*, are of small Durance; Whereas *Hyssope*, *Winter-Savoury*, *Germander*, *Thyme*, *Sage*, will last long. The *Cause* is, for that *Trees* last according to the *Strength*, and *Quantitie* of their *Sap* and *Iuyce*; Being well munited by their *Barke* against the Injuries of the *Aire*: But *Herbs* draw a Weake *Iuyce*; And have a soft *Stalke*; And therefore those amongst them which last longest, are *Herbs* of *Strong Smell*, and with a *Stickie Stalke*.

584 *Trees* that beare *Mast*, and *Nuts*, are commonly more lasting, than those that beare *Fruits*; Especially the *Moister Fruits*: As *Oakes*, *Beeches*, *Chesnuts*, *Wall-nuts*, *Almonds*, *Pine-Trees*, &c. last longer than *Apples*, *Peares*, *Plums*, &c. The *Cause* is the *Fatnesse* and *Oylinesse* of the *Sap*; Which ever wasteth lesse, than the more *Watry*.

585 *Trees*, that bring forth their *Leaves* late in the *Yeare*, and cast them likewise late, are more *lasting*, than those that sprout their Leaves Early, or shed

shed them betimes. The *Cause* is, for that the late *Comming forth* sheweth a *Moisture* more fixed; And the other more loose, and more easily resolved. And the same *Cause* is, that *Wilde-Trees* last longer than *Garden-Trees*; And in the same kinde, those whose *Fruit* is Acide, more than those whose *Fruit* is sweet.

586 Nothing procureth the *Lasting* of *Trees*, *Bushes*, and *Herbs*, so much, as often *Cutting*: For every *Cutting* causeth a Renovation of the *Iuyce* of the *Plant*; That it neither goeth so farre, nor riseth so faintly, as when the *Plant* is not *Cut*: Insomuch as *Annuall Plants*, if you cut them seasonably, and will spare the use of them, and suffer them to come up still young, will last more Yeares than one; As hath beene partly touched; Such as is *Lettuce*, *Purslane*, *Cucumber*, and the like. And for *Great Trees*, we see almost all *Over-growne-Trees*, in Church-yards, or neare Ancient Buildings, and the like, are *Pollards*, or *Dottards*, and not *Trees* at their full Height.

587 Some *Experiment* would be made, how by *Art* to make *Plants* more *Lasting*, than their ordinarie Period; As to make a *Stalke* of *Wheat*, &c. last a whole yeare. You must ever presuppose, that you handle it so, as the *Winter* killeth it not; For we speake onely of *Prolonging* the *Naturall Period*. I conceive, that the *Rule* will hold; That whatsoever maketh the *Herb* come later, than at his time, will make it last longer time: It were good to trie it, in a *Stalke* of *Wheat*, &c. set in the Shade, and encompassed with a Case of *Wood*, not touching the *Straw*, to keepe out Open *Aire*.

As for the Preservation *of* Fruits, *and* Plants, *as well upon the* Tree, *or* Stalke, *as gathered, we shall handle it under the* Title *of* Conservation *of* Bodies.

Experiments in Consort touching the severall *Figures* of *Plants*.

588 THe *Particular Figures* of *Plants* wee leave to their *Descriptions*; But some few Things, in generall, we will observe. *Trees* & *Herbs*, in the Growing forth of their *Boughes*, and *Branches*, are not *Figured*, and keep no Order. The *Cause* is, for that the *Sap*, being restrained in the *Rinde*, and *Barke*, breaketh not forth at all; (As in the Bodies of *Trees*, and *Stalks* of *Herbs*,) till they begin to branch; And then, when they make an Eruption, they breake forth casually, where they finde best way, in the *Barke*, or *Rinde*. It is true, that some *Trees* are more scattered in their *Boughes*; As *Sallow-Trees*, *Warden-Trees*, *Quince-Trees*, *Medlar-Trees*, *Limon-Trees*, &c. Some are more in the forme of a *Pyramis*, and come almost to todd; As the *Peare-Tree*, (which the *Criticks* will have to borrow his name of πῦρ, *Fire*,) *Orenge-Trees*, *Firre-Trees*, *Service-Trees*, *Lime-Trees*, &c. And some are more spred and broad; As *Beeches*, *Hornebeame*, &c. The rest are more indifferent. The *Cause* of Scattering the *Boughes*, is the Hastie breaking forth of the *Sap*; And therefore those *Trees* rise not in a *Body* of any Height, but branch neare the *Ground*. The *Cause* of the *Pyramis*, is the Keeping in of the *Sap*, long before it branch; And the spending of it when it beginneth to branch, by equall degrees. The

Spreading

Spreading is caused by the *Carrying* up of the *Sap*, plentifully, without Expence; And then putting it forth speedily, and at once.

589 There be divers *Herbs*, but no *Trees*, that may be said to have some kinde of Order, in the Putting forth of their *Leaves*: For they have *Ioynts*, or *Knuckles*, as it were Stops in their *Germination*; As have *Gilly-Flowers*, *Pincks*, *Fennell*, *Corne*, *Reeds*, and *Canes*. The *Cause* whereof is, for that the *Sap* ascendeth unequally, and doth (as it were) tire and stop by the way. And it seemeth, they have some *Closenesse*, and *Hardnesse* in their *Stalke*, which hindreth the *Sap* from going up, untill it hath gathered into a Knot, and so is more urged to put forth. And therefore, they are most of them hollow, when the *Stalke* is dry. As *Fennell-Stalk*, *Stubble*, and *Canes*.

590 *Flowers* have (all) exquisite *Figures*; And the *Flower-Numbers* are (chiefly) *Five*, and *Foure*; As in *Prime-Roses*, *Brier-Roses*, *Single Muske-Roses*, *Single Pinks*, and *Gilly-Flowers*, &c. which have five *Leaves*: *Lillies*, *Flower-de-luces*, *Borage*, *Bugloss*, &c. which have foure Leaves. But some put forth *Leaves* not Numbred; But they are ever small Ones; As *Mary-Golds*, *Trifoile*, &c. Wee see also, that the *Sockets*, and *Supporters* of *Flowers*, are *Figured*; As in the Five *Brethren* of the *Rose*; *Sockets* of *Gilly-Flowers*, &c. *Leaves* also are all *Figured*; Some Round, Some Long; None Square; And many jagged on the Sides; Which *Leaves* of *Flowers* seldome are. For I account the *Iagging* of *Pinks*, and *Gilly-Flowers*, to be like the Inequalitie of *Oake-leaves*, or *Vine-leaves*, or the like; But they seldome or never have any small *Purles*.

Experiments in Consort touching some *Principall Differences* in *Plants*.

591 OF *Plants*, some few put forth their *Blossomes* before their *Leaves*; As *Almonds*, *Peaches*, *Cornelians*, *Black-Thorne*, &c. But most put forth some *Leaves* before their *Blossomes*; As *Apples*, *Peares*, *Plums*, *Cherries*, *White-Thorne*, &c. The *Cause* is, for that those, that put forth their *Blossomes* first, have either an Acute and *Sharp Spirit*; (And therefore commonly they all put forth earely in the Spring, and ripen verie late; As most of the Particulars before mentioned;) Or else an *Oyly Iuyce*, which is apter to put out *Flowers*, than *Leaves*.

592 Of *Plants*, some are *Greene* all *Winter*; Others cast their *Leaves*. There are *Greene* all *Winter*; *Holly*, *Ivy*, *Box*, *Firre*, *Eugh*, *Cypresse*, *Iuniper*, *Bayes*, *Rose-Mary*, &c. The *Cause* of the Holding *Greene*, is the Close and Compact *Substance* of their *Leaves*, and the *Pedicles* of them. And the *Cause* of that againe, is either the *Tough* and *Viscous Iuyce* of the *Plant*; Or the *Strength* and *Heat* thereof. Of the first Sort is *Holly*; Which is of so *Viscous* a *Iuyce*, as they make *Birdlime* of the *Barke* of it. The *Stalke* of *Ivy* is Tough, and not Fragile, as wee see in other small Twigs dry. *Firre* yeeldeth *Pitch*. *Box* is a fast and heavie *Wood*, as we see it in *Boules*. *Eugh* is a Strong and Tough *Wood*, as we see it in *Bowes*. Of the second Sort is *Iuniper*, which is a *Wood* Odorate, and maketh a hot Fire. *Bayes* is likewise a Hot and Aromaticall *Wood*; And so is *Rose-Mary* for a *Shrub*. As for the *Leaves*, their Densitie appeareth, in that, either they are Smooth

and

and Shining, as in *Bayes*, *Holly*, *Ivy*, *Box*, &c. Or in that they are Hard and Spirie, as in the reſt. And Triall would be made of *Grafting* of *Roſe-Marie*, and *Bayes*, and *Box*, upon a *Holly-Stocke*; Becauſe they are *Plants* that come all *Winter*. It were good to trie it alſo with *Grafts* of other *Trees*, either *Fruit-Trees*, or *Wilde-Trees*; To ſee whether they will not yeeld their *Fruit*, or beare their *Leaves*, later, and longer in the *Winter*; becauſe the *Sap* of the *Holly* putteth forth moſt in the *winter*. It may be alſo a *Mezereon Tree*, grafted upon a *Holly*, will prove both an Earlier, and a Greater *Tree*.

593 There be ſome *Plants*, that beare no *Flower*, and yet beare *Fruit*: There be ſome, that beare *Flowers*, and no *Fruit*: There be ſome that beare neither *Flowers*, nor *Fruit*. Moſt of the great *Timber-Trees*, (as *Oakes*, *Beeches*, &c.) beare no apparent *Flowers*: Some few (likewiſe) of the *Fruit-Trees*; As *Mulberrie*, *Wall-nut*, &c. And ſome *Shrubs*, (as *Iuniper*, *Holly*, &c.) beare no *Flowers*. Divers *Herbs* alſo beare *Seeds*, (which is as the *Fruit*,) and yet beare no *Flowers*; As *Purſlane*, &c. Thoſe that beare *Flowers* and no *Fruit*, are few; As the *Double Cherrie*, the *Sallow*, &c. But for the *Cherrie*, it is doubtfull, whether it be not by Art, or Culture; For if it be by Art, then Triall would be made, whether *Apples*, and other *Fruits Bloſſomes*, may not be doubled. There are ſome Few, that beare neither *Fruit*, nor *Flower*; As the *Elme*, the *Poplars*, *Box*, *Brakes*, &c.

594 There be ſome *Plants*, that ſhoot ſtill upwards, and can *Support* themſelves; As the greateſt Part of *Trees* and *Plants*: There be ſome Other, that *Creepe* along the *Ground*; Or *Winde* about other *Trees*, or *Props*, and cannot ſupport themſelves; As *Vines*, *Ivy*, *Briar*, *Briony*, *Woodbines*, *Hop's*, *Climatis*, *Camomill*, &c. The *Cauſe* is, (as hath beene partly touched,) for that all *Plants*, (naturally) move upwards; But if the *Sap* put up too faſt, it maketh a ſlender *Stalke*, which will not ſupport the weight: And therefore theſe latter Sort are all Swift and Haſtie Commers.

Experiments in Conſort touching all Manner of *Compoſts*, and *Helps* of *Ground*.

595 THe firſt and moſt Ordinarie *Helpe* is *Stercoration*. The *Sheeps-Dung* is one of the beſt; And next, the *Dung* of *Kine*: And thirdly, that of *Horſes*: Which is held to be ſomewhat too hot, unleſſe it be mingled. That of *Pigeons* for a Garden, or a ſmall Quantitie of Ground, excelleth. The *Ordering* of *Dung* is; If the *Ground* be *Arable*, to ſpread it immediately before the *Ploughing* and *Sowing*: And ſo to *Plough* it in: For if you ſpread it long before, the *Sunne* will draw out much of the *Fatneſſe* of the *Dung*: If the *Ground* be *Grazing Ground*, to ſpread it ſomewhat late, towards *winter*; That the *Sunne* may have the leſſe Power to drie it up. As for ſpeciall *Compoſts* for *Gardens*, (as a *Hot Bed*, &c.) wee have handled them before.

596 The Second *Kind* of *Compoſt*, is the *Spreading* of divers *Kinds* of *Earth*; As *Marle*, *Chalke*, *Sea-Sand*, *Earth* upon *Earth*, *Pond-Earth*; And the *Mixtures* of them. *Marle* is thought to be the beſt; As having moſt Fatneſſe;

And

And not Heating the *Ground* too much. The next is *Sea-Sand*; Which (no doubt) obtaineth a speciall Vertue, by the *Salt*: For *Salt* is the first Rudiment of life. *Chalk* over-heateth the *Ground* a little. And therfore is best upon *Cold Clay-Grounds*, or *Moist Grounds*: But I heard a great *Husband* say, that it was a common Errour, to thinke that *Chalk* helpeth *Arable Grounds*, but helpeth not *Grazing Grounds*; Whereas (indeed) it helpeth *Grasse*, as well as *Corne*: but that which breedeth the Errour is, because after the *Chalking* of the *Ground*, they weare it out with many *Crops*, without Rest; And then (indeed) afterwards it will beare little *Grasse*, because the *Ground* is tired out. It were good to trie the laying of *Chalke* upon *Arable Grounds*, a little while before *Ploughing*; And to *Plough* it in, as they doe the *Dung*; But then it must be Friable first, by Raine, or Lying: As for *Earth*, it *Compasseth* it Selfe; For I knew a *Great Garden*, that had a *Field* (in a manner) powred upon it; And it did beare *Fruit* excellently the first yeare of the Planting: For the *Surface* of the *Earth* is ever the Fruitfullest. And *Earth* so prepared hath a double *Surface*. But it is true, as I conceive, that such *Earth*, as hath *Salt-Petre* bred in it, if you can procure it without too much charge, doth excell. The way to hasten the *Breeding* of *Salt-Petre*, is to forbid the Sunne, and the Growth of *Vegetables*. And therefore, if you make a large Hovell, thatched, over some Quantitie of Ground; Nay if you doe but Planck the Ground over, it will breed *Salt-Petre*. As for *Pond-Earth*, or *River-Earth*, it is a verie good *Compost*; Especially if the *Pond* have been long uncleansed, and so the *Water* be not too Hungrie: And I judge it will be yet better, if there be some *Mixture* of *Chalke*.

597 The Third *Help* of *Ground*, is, by some other *Substances*, that have a Vertue to make *Ground* Fertile; though they be not meerely *Earth*: wherein *Ashes* excell; In so much as the Countries about *Ætna*, and *Vesuvius*, have a kinde of Amends made them, for the Mischiefe the Eruptions (many times) doe, by the exceeding *Fruitfulnesse* of the *Soile*, caused by the *Ashes*, scattered about. *Soot* also, though thin spred, in a *Field*, or *Garden*, is tried to be a verie good *Compost*. For *Salt*, it is too Costly: But it is tried, that mingled with *Seed-Corne*, and sowen together, it doth good: And I am of Opinion, that *Chalke* in Powder, mingled with *Seed-Corne*, would doe good; Perhaps as much as *Chalking* the *Ground* all over. As for the *Steeping* of the *Seeds*, in severall *Mixtures* with *Water*, to give them Vigour; Or *Watring Grounds* with *Compost-Water*; We have spoken of them before.

598 The Fourth *Help* of *Ground*, is, the *Suffering* of *Vegetables to dye into the Ground*; And so to Fatten it; As the *Stubble* of *Corne*, Especially *Pease*. *Brakes* cast upon the *Ground*, in the beginning of *Winter*, will make it verie Fruitfull. It were good (also) to trie, whether *Leaves* of *Trees* swept together, with some *Chalke* and *Dung* mixed, to give them more Heart, would not make a good *Compost*: For there is nothing lost, so much as *Leaves* of *Trees*; And as they lye scattered, and without Mixture, they rather make the *Ground* soure, than otherwise.

The

The Fifth *Helpe* of *Ground*, is *Heat* and *warmth*. It hath beene anciently practiſed to burne *Heath*, and *Ling*, and *Sedge*, with the vantage of the *wind*, upon the *Ground*: Wee ſee, that *Warmth* of *Walls* and *Enclo-ſures*, mendeth *Ground*: Wee ſee alſo that *Lying open* to the *South*, mendeth *Ground*: Wee ſee againe, that the *Foldings* of *Sheepe* helpe *Ground*, as well by their *Warmth*, as by their *compoſt*: And it may bee doubted, whether the *Covering* of the *Ground* with *Brakes*, in the Beginning of the *Winter*, (whereof wee ſpake in the laſt *Experiment*,) helpeth it not, by reaſon of the *Warmth*. Nay ſome very good *Husbands* doe ſuſpect, that the *Gathering* up of *Flints*, in *Flinty Ground*, and Laying them on *Heapes*, (which is much uſed,) is no good *Husbandry*; For that they would keep the *Ground* Warme. 599

The Sixth *Helpe* of *Ground* is, by *Watering*, and *Irrigation*; which is in two Manners: The one by *Letting* in, and *Shutting* out *waters*, at ſeaſonable Times: For *Water*, at ſome Seaſons, and with reaſonable ſtay, doth good; But at ſome other Seaſons, and with too long Stay, doth hurt. And this ſerveth onely for *Meadowes*, which are along ſome *River*. The other way is, to bring *Water*, from ſome *Hanging Grounds*, where there are *Springs*, into the *Lower Grounds*, carrying it in ſome long *Furrowes*; And from thoſe *Furrowes*, drawing it traverſe to ſpread the *water*. And this maketh an excellent Improvement, both for *Corne*, and *Graſſe*. It is the richer, if thoſe *Hanging Grounds* be fruitfull, becauſe it waſheth off ſome of the Fatneſſe of the *Earth*: But howſoever it profiteth much. Generally, where there are great Overflowes, in *Fens*, or the like, the drowning of them in the *Winter*, maketh the *Summer* following more fruitfull: The *Cauſe* may be, for that it keepeth the *Ground* warme, and nouriſheth it: But the *Fen-Men* hold, that the *Sewers* muſt be kept ſo, as the *water* may not ſtay too long in the *Spring*, till the *weeds* and *Sedge* bee growne up; For then the *Ground* will bee like a Wood, which keepeth out the Sunne; And ſo continueth the Wet; Whereby it will never graze (to purpoſe) that yeare. Thus much for *Irrigation*. But for *Avoydances*, and *Draynings* of water, where there is too much, and the *Helps* of *Ground* in that kinde, wee ſhall ſpeake of them in another Place. 600

NATVRALL HISTORIE.

VII. Century.

THe *Differences* betweene *Animate* and *Inanimate Bodies*, wee shall handle fully under the *Title* of *Life*, and *Living Spirits*, and *Powers*. Wee shall therefore make but a briefe Mention of them in this Place. The Maine *Differences* are two. All *Bodies* have *Spirits*, and *Pneumaticall Parts* within them: But the Maine *Differences* betweene *Animate* and *Inanimate*, are two: The first is, that the *Spirits* of *Things Animate*, are all *Continued* with themselves, and are *Branched* in *Veines*, and secret *Canales*, as *Bloud* is: And in *Living Creatures*, the *Spirits* have not only *Branches*, but certaine *Cells* or *Seats*, where the *Principall Spirits* doe reside, and whereunto the rest doe resort: But the *Spirits* in *Things Inanimate* are shut in, and cut off by the *Tangible Parts*; And are not peruious one to another; As *Aire* is in *Snow*. The second Maine *Difference* is, that the *Spirits* of *Animate Bodies*, are all in some degree, (more or lesse,) kindled and inflamed; And have a fine *Commixture* of *Flame*, and an *Aëriall Substance*. But *Inanimate Bodies* have their *Spirits* no whit *Inflamed*, or *Kindled*. And this *Difference* consisteth not in the *Heat* or *Coolenesse* of *Spirits*; For *Cloves* and other *Spices*, *Naphtha* and *Petroleum*, have exceeding *Hot Spirits*, (hotter a great deale than *Oyle*, *Wax*, or *Tallow*, &c.) but not *Inflamed*. And when any of those Weake and Temperate *Bodies* come

Experiments in Consort, touching the *Affinities*, and *Differences*, betweene *Plants* and *Inanimate Bodies*.

601

to be Inflamed, then they gather a much greater *Heat*, than others have *Vn-inflamed*; besides their *Light*, and *Motion*, &c.

602 The *Differences*, which are *Secundary*, and proceed from these two *Radicall Differences*, are; First, *Plants* are all *Figurate* and *Determinate*, which *Inanimate Bodies* are not; For looke how farre the *Spirit* is able to Spread and Continue it selfe; So farre goeth the *Shape*, or *Figure*; And then is *determined*. Secondly, *Plants* doe nourish; *Inanimate Bodies* doe not: They have an *Accretion*, but no *Alimentation*. Thirdly, *Plants* have a *Period* of *Life*; which *Inanimate Bodies* have not. Fourthly, they have a *Succession*, and *propagation* of their *Kinde*; which is not in *Bodies Inanimate*.

603 The *Differences* betweene *Plants*, and *Metalls* or *Fossiles*, besides those foure before mentioned, (For *Metalls* I hold Inanimate,) are these: First *Metalls* are more *Durable* than *Plants*: Secondly, they are more *Solid* and *Hard*: Thirdly, they are wholly *Subterrany*; Whereas *Plants* are part above *Earth*, and part under *Earth*.

604 There be very few *Creatures*, that participate of the *Nature* of *Plants*, and *Metalls* both; *Corall* is one of the Neareſt of both *Kindes*: Another is *Vitriall*, for that is apteſt to ſprout with *Moiſture*.

605 Another ſpeciall *Affinitie* is betweene *Plants* and *Mould* or *Putrefaction*: For all *Putrefaction* (if it diſſolve not in *Arefaction*) will in the ende iſſue into *Plants*, or *Living Creatures* bred of *Putrefaction*. I account *Moſſe*, and *Muſhromes*, and *Agaricke*, and other of thoſe kinds, to be but *Moulds* of the *Ground*, *Walls*, and *Trees*, and the like. As for *Fleſh*, and *Fiſh*, and *Plants* themſelves, and a Number of other things, after a *Mouldineſſe*, or *Rottenneſſe*, or *Corrupting*, they will fall to breed *Wormes*. Theſe *Putrefactions*, which have *Affinitie* with *Plants*, have this *Difference* from them; That they have no *Succeſſion* or *Propagation*, though they *Nouriſh*, and have a *Period* of *Life*, and have likewiſe ſome *Figure*.

606 I left once, by chance, a *Citron* cut, in a cloſe Roome, for three Summer-moneths, that I was abſent; And at my Returne, there were grown forth, out of the Pith cut, *Tufts* of *Haires*, an Inch long, with little blacke Heads, as if they would have beene ſome *Herbe*.

Experiments in Conſort touching the *Affinities*, and *Differences*, of *Plants*, and *Living Creatures*: And the *Confinehs* and *Participles* of them.

THe *Affinities* and *Differences* betweene *Plants* and *Living Creatures*, are theſe that follow. They have both of them *Spirits Continued*, and *Branched*, and alſo *Inflamed*: But firſt in *Living Creatures*, the *Spirits* have a *Cell* or *Seat*, which *Plants* have not; As was alſo formerly ſaid. And ſecondly, the *Spirits* of *Living Creatures* hold more of *Flame*, than the *Spirits* of *Plants* doe. And theſe two are the *Radicall Differences*. For the *Secondary Differences*, they are as follow. First, *Plants* are all *Fixed* to the *Earth*; Whereas all *Living Creatures* are ſevered, and of themſelves. Secondly, *Living Creatures* have *Locall Motion*; *Plants* have not. Thirdly, *Living Creatures* nouriſh from their *Vpper Parts*, by the *Mouth* chiefly; *Plants* nouriſh from below, namely from the *Roots*. Fourthly, *Plants* have their *Seed* and *Seminall Parts* uppermoſt; *Living Creatures*

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have

have them lower most: And therefore it was said, not elegantly alone, but Philosophically; *Homo est Planta inversa*; *Man is like a Plant turned upwards*: For the *Root* in *Plants*, is as the *Head* in *Living Creatures*. Fifthly, *Living Creatures* have a more exact *Figure* than *Plants*. Sixthly, *Living Creatures* have more *Diversity* of *Organs* within their *Bodies*, and (as it were) *Inward Figures*, than *Plants* have. Seventhly, *Living Creatures* have *Sense*, which *Plants* have not. Eightly, *Living Creatures* have *Voluntary Motion*, which *Plants* have not.

608 For the *Difference* of *Sexes* in *Plants*, they are oftentimes by name distinguished; As *Male-Piony*, *Female-Piony*; *Male-Rose-mary*, *Female-Rose-mary*; *Hee-Holly*, *Shee-Holly*; &c. but *Generation* by *Copulation* (certainly) extendeth not to *Plants*. The neareſt Approach of it, is between the *Hee-Palme*, and the *Shee-Palme*; which, (as they report,) if they grow neare, incline the one to the other: In so much as, (that which is more strange,) they doubt not to report, that to keepe the *Trees* upright from Bending, they tye *Ropes*, or *Lines*, from the one to the other, that the *Contact* might be enjoyed by the *Contact* of a *Middle Body*. But this may be Fained, or at least Amplified. Nevertheleſſe, I am apt enough to thinke, that this same *Binarium* of a Stronger and a Weaker, like unto *Masculine* and *Feminine*, doth hold in all *Living Bodies*. It is confounded sometimes; As in some *Creatures* of *Putrefaction*, wherein no *Markes* of *Distinction* appeare: And it is doubled sometimes; As in *Hermaphrodites*: But generally there is a Degree of Strength in most *Species*.

609 The *Participles* or *Confiners* betweene *Plants* and *Living Creatures*, are such chiefly, as are *Fixed*, and have no *Locall Motion* of *Remove*, though they have a *Motion* in their *Parts*; Such as are *Oysters*, *Cockles*, and such like. There is a Fabulous Narration, that in the *Northerne Countries*, there should be an *Herbe* that groweth in the likeneſſe of a *Lambe*, and feedeth upon the *Grasse*, in such sort as it will bare the *Grasse* round about. But I suppose, that the *Figure* maketh the *Fable*; For so wee see, there bee *Bee-Flowers*, &c. And as for the *Grasse*, it seemeth the *Plant*, having a great *Stalke* and *Top*, doth prey upon the *Grasse*, a good way about, by drawing the *Iuyce* of the *Earth* from it.

Experiments *Promiscuous* touching *Plants*.

610 The *Indian Fig* boweth his *Roots* downe so low, in one yeare, as of it selfe it taketh *Root* againe: And so multiplieth from *Root* to *Root*; Making of one *Tree* a kinde of *wood*. The *Cause* is the *Plenty* of the *Sap*, and the *Softneſſe* of the *Stalke*, which maketh the *Bough*, being overloaden, and not stiffely upheld, weigh downe. It hath *Leaves*, as broad as a little *Target*, but the *Fruit* no bigger than *Beanes*. The *Cause* is, for that the continuall Shade increaseth the *Leaves*, and abateth the *Fruit*; which nevertheleſſe is of a pleasant Taste. And that (no doubt) is caused, by the *Suppleneſſe* and *Gentleneſſe* of the Juyce of that *Plant*, being that which maketh the *Boughes* also so Flexible.

611 It is reported by one of the *Ancients*, that their is a certaine *Indian*

Tree, having few, but very great, *Leaves*, three Cubits long, and two broad; And that the *Fruit*, being of good Taste, groweth out of the *Barke*. It may be, there be *Plants*, that poure out the *Sap* so fast, as they have no leisure, either to divide into many *Leaves*, or to put forth *Stalks* to the *Fruit*. With us *Trees* (generally) have small *Leaves*, in comparison. The *Fig* hath the greatest; And next it the *Vine*, *Mulberry*, and *Sycamore*; And the Least are those of the *Willow*, *Birch*, and *Thorne*. But there be found *Herbs* with farre greater *Leaves* than any *Tree*; As the *Burre*, *Gourd*, *Cucumber*, and *Cole-wort*. The *Cause* is, (like to that of the *Indian Fig*,) the hasty and plentifull Putting forth of the *Sap*.

612 There bee three *Things* in use for *Sweetnesse*; *Sugar*, *Honey*, *Manna*. For *Sugar*, to the *Ancients* it was scarce knowne, and little used. It is found in *Canes*: *Quære*, whether to the first *Knuckle*, or further up? And whether the very *Barke* of the *Cane* it selfe do yeeld *Sugar*, or no? For *Honey*, the *Bee* maketh it, or gathereth it; But I have heard from one, that was industrious in Husbandry, that the labour of the *Bee* is about the *Wax*; And that hee hath knowne in the beginning of *May*, *Honey-Combs* empty of *Honey*; And within a forthnight, when the Sweet *Dewes* fall, filled like a *Cellar*. It is reported by some of the *Ancients*, that there is a *Tree* called *Occhus*, in the Valleyes of *Hyrcania*, that distilleth *Honey* in the *Mornings*. It is not unlike, that the *Sap* and *Teares* of some *Trees*, may be sweet. It may bee also, that some sweet Juyces, fit for many uses, may be concocted out of *Fruits*, to the Thicknesse of *Honey*, or perhaps of *Sugar*; The likeliest are *Rasins* of the Sunne, *Figs*, and *Corrans*: The Meanes may be enquired.

613 The *Ancients* report of a *Tree*, by the *Persian Sea*, upon the *Shore-Sands*, which is nourished with the *Salt-Water*; And when the *Tide* ebbeth, you shall see the *Roots*, as it were, bare without *Barke*, (being as it seemeth corroded by the *Salt*,) and grasping the *Sands* like a *Crab*; Which nevertheless beareth a *Fruit*. It were good to try some *Hard Trees*, as a *Service-Tree*, or *Firre-Tree*, by setting them within the *Sands*.

614 There bee of *Plants*, which they use for *Garments*, these that follow. *Hempe*; *Flax*; *Cotton*; *Nettles*, (whereof they make *Nettle-Cloth*;) *Sericum*, which is a *Growing Silke*; They make also *Cables* of the *Barke* of *Lime-Trees*. It is the *Stalke* that maketh the *Filaceous* Matter, commonly; And sometimes the *Downe* that groweth above.

615 They have, in some *Countries*, a *Plant* of a *Rosy Colour*, which shutteth in the *Night*, Openeth in the *Morning*, and Openeth wide at *Noone*; which the *Inhabitants* of those *Countries* say is a *Plant* that *Sleepeth*. There bee *Sleepers* enow then; For almost all *Flowers* doe the like.

616 Some *Plants* there are, but rare, that have a *Mossy* or *Downy Root*; And likewise that have a Number of *Threds*, like *Beards*; As *Mandrakes*; wherof *Witches* and *Impostours* make an ugly *Image*, giving it the Forme of a *Face* at the *Top* of the *Root*, and leave those *Strings* to make a broad *Beard* downe to the Foot. Also there is a Kinde of *Nard*, in *Creet*, (being a Kinde of *Phu*) that hath a *Root* hairy, like a *Rough-Footed-Doves*

foot.

foot. So as you may see, there are of *Roots*, *Bulbous Roots*, *Fibrous Roots*, and *Hirsute Roots*. And, I take it, in the *Bulbous*, the Sap hasteneth most to the Aire, and Sunne: In the *Fibrous*, the Sap delighteth more in the Earth, and therefore putteth downward: And the *Hirsute* is a Middle betweene both; That besides the Putting forth upwards, and downwards, putteth forth in Round.

There are some *Teares* of *Trees*, which are kembed from the *Beards* of *Goats*: For when the *Goats* bite and crop them, especially in the Mornings, the Dew being on, the *Teare* commeth forth, and hangeth upon their *Beards*: Of this Sort is some kinde of *Ladanum*. 617

The *Irrigation* of the *Plaine-Tree* by *Wine*, is reported by the *Ancients*, to make it Fruitfull. It would bee tried likewise with *Roots*; For upon *Seeds* it worketh no great Effects. 618

The way to carry *Forraine Roots*, a long Way, is to vessell them close in *Earthen Vessells*. But if the *Vessells* be not very Great, you must make some Holes in the Bottome, to give some Refreshment to the *Roots*; Which otherwise (as it seemeth,) will decay, and suffocate. 619

The ancient *Cinnamon*, was, of all other *Plants*, while it grew, the Dryest; And those Things, which are knowne to comfort other *Plants*, did make that more Sterill: For in *Showers* it prospered worst: It grew also amongst *Bushes* of other kindes, where commonly *Plants* doe not thrive: Neither did it love the Sunne: There might bee one *Cause* of all those Effects; Namely, the sparing Nourishment, which that *Plant* required. *Quære* how farre *Cassia*, which is now the Substitute of *Cinnamon*, doth participate of these Things. 620

It is reported by one of the *Ancients*, that *Cassia*, when it is gathered, is put into the *Skins* of *Beasts*, newly fleyed; And that the *Skins* Corrupting, and Breeding *Wormes*, the *Wormes* doe devoure the *Pith* and *Marrow* of it, and so make it Hollow; But meddle not with the *Barke*, because to them it is bitter. 621

There were, in Ancient Time, *Vines*, of farre greater *Bodies*, than wee know any; For there have beene *Cups* made of them, and an *Image* of *Iupiter*. But it is like they were *Wilde-Vines*; For the *Vines*, that they use for *Wine*, are so often Cut, and so much Digged and Dressed, that their *Sap* spendeth into the *Grapes*, and so the *Stalke* cannot increase much in *Bulke*. The *Wood* of *Vines* is very durable, without *Rotting*. And that which is strange, though no *Tree* hath the *Twigges*, while they are greene, so brittle, yet the *Wood* dryed is extreme Tough; And was used by the *Captaines* of *Armies*, amongst the *Romans*, for their *Cudgells*. 622

It is reported, that in some Places, *Vines* are suffered to grow like *Herbs*, spreading upon the *Ground*; And that the *Grapes* of those *Vines* are very great. It were good to make tryall, whether *Plants* that use to bee borne up by Props, will not put forth greater *Leaves*, and greater *Fruits*, if they be laid along the *Ground*; As *Hops*, *Iuy*, *Wood-bine*, &c. 623

Quinces, or *Apples*, &c. if you will keepe them long, drowne them in *Honey*; But because *Honey* (perhaps) will give them a Taste Overlushious, 624

luſhious, it were good to make Triall in *Powder* of *Sugar*; Or in *Syrrup* of *Wine* onely Boyled to Height. Both theſe would likewiſe be tried in *Orenges*, *Limons*, and *Pomgranats*; For the *Powder* of *Sugar*, and *Syrrup* of *Wine*, will ſerve for more times than once.

625 The *Conſervation* of *Fruit* would be alſo tried in *Veſſells*, filled with *fine Sand*, or with *Powder* of *Chalke*; Or in *Meale* and *Flower*; Or in *Duſt* of *Oake-wood*; Or in *Mill*.

626 Such *Fruits*, as you appoint for *Long Keeping*, you muſt gather before they be full *Ripe*; And in a *Faire* and *Dry Day*, towards *Noone*; And when the *Winde* bloweth not *South*; And when the *Moone* is under the *Earth*; And in *Decreaſe*.

627 Take *Grapes*, and hang them in an *Empty Veſſell*, well Stopped; And ſet the *Veſſell*, not in a *Cellar*, but in ſome dry *Place*; And it is ſaid, they will laſt long. But it is reported by ſome, they will keepe better, in a *Veſſell* halfe full of *Wine*, ſo that the *Grapes* touch not the *Wine*.

628 It is reported, that the *Preſerving* of the *Stalke*, helpeth to preſerve the *Grape*; Eſpecially if the *Stalke* be put into the *Pith* of *Elder*, the *Elder* not touching the *Fruit*.

629 It is reported by ſome of the *Ancients*, that *Fruit* put in *Bottles*, and the *Bottles* let downe into *Wells* under *Water*, will keepe long.

630 Of *Herbs* and *Plants*, ſome are good to eat *Raw*; As *Lettuce*, *Endive*, *Purſlane*, *Tarragon*, *Creſſes*, *Cucumbers*, *Muske-Melons*, *Radiſh*, &c. Others onely after they are *Boyled*, or have *Paſſed the Fire*; As *Parſley*, *Clary*, *Sage*, *Parſnips*, *Turnips*, *Aſparagus*, *Artichoaks*, (though they alſo being young are eaten *Raw*:) But a Number of *Herbs* are not *Eſculent* at all; As *Worme-Wood*, *Graſſe*, *Greene-Corne*, *Centory*, *Hyſſope*, *Lavender*, *Balme*, &c. The *Cauſes* are, for that the *Herbs*, that are not *Eſculent*, doe want the two *Taſtes*, in which *Nouriſhment* reſteth; Which are, *Fat*, and *Sweet*; And have (contrariwiſe) *Bitter* and *Over-ſtrong Taſtes*, or a *Iuyce* ſo Crude, as cannot be ripened to the degree of *Nouriſhment*. *Herbes* and *Plants*, that are *Eſculent Raw*, have *Fatneſſe*, or *Sweetneſſe*, (as all Eſculent *Fruits*;) Such are *Onions*, *Lettuce*, &c. But then it muſt be ſuch a *Fatneſſe*, (for as for *Sweet Things*, they are in effect alwayes *Eſculent*,) as is not Over-groſſe, and Loading of the *Stomach*; For *Parſnips* and *Leeks* have *Fatneſſe*; But it is to Groſſe and Heavy without *Boyling*. It muſt be alſo in a Subſtance ſomewhat Tender; For we ſee *wheat*, *Barley*, *Artichoakes*, are no good *Nouriſhment*, till they have paſſed the *Fire*; But the *Fire* doth ripen, and maketh them ſoft and tender, and ſo they become *Eſculent*. As for *Radiſh*, and *Tarragon*, and the like, they are for *Condiments*, and not for *Nouriſhment*. And even ſome of thoſe *Herbes*, which are not *Eſculent*, are notwithſtanding *Poculent*; As *Hop's*, *Broome*, &c. *Quære* what *Herbs* are good for *Drinke*, beſides the two aforenamed; For that it may (perhaps) eaſe the Charge of *Brewing*, if they make *Beere* to require leſſe *Malt*, or make it laſt longer.

631 *Parts* fit for the *Nouriſhment* of *Man*, in *Plants*, are, *Seeds*, *Roots*, and *Fruits*; But chiefly *Seeds*, and *Roots*. For *Leaves*, they give no *Nouriſhment*,

ment, at all, or very little: No more doe *Flowers*, or *Blossomes*, or *Stalkes*. The Reason is, for that *Roots*, and *Seeds*, and *Fruits*, (in as much as all *Plants* consist of an *Oyly* and *Watry Substance* commixed,) have more of the *Oyly Substance*; And *Leaves*, *Flowers*, &c. of the *Watry*. And secondly, they are more *Concocted*; For the *Root*, which continueth ever in the *Earth*, is still *Concocted* by the *Earth*; And *Fruits*, and *Graines*, (we see) are halfe a yeare, or more, in *Concocting*; Whereas *Leaves* are out, and Perfect in a Moneth.

632 *Plants* (for the most part) are more strong, both in *Taste*, and *Smell*, in the *Seed*, than in the *Leafe*, and *Root*. The *Cause* is, for that in *Plants*, that are not of a Fierce and Eager *Spirit*, the Vertue is increased by *Concoction*, and *Maturation*, which is ever most in the *Seed*; But in *Plants*, that are of a Fierce and Eager Spirit, they are stronger whilest the *Spirit* is enclosed in the *Root*; And the *Spirits* doe but weaken, and dissipate, when they come to the *Aire*, and *Sunne*; As we see it in *Onions*, *Garlicke*, *Dragon*, &c. Nay there be *Plants*, that have their *Roots* very *Hot*, and *Aromaticall*; And their *Seeds* rather *Insipide*; As *Ginger*. The *Cause* is (as was touched before,) for that the *Heat* of those *Plants* is very Dissipable; which under the *Earth* is contained and held in; But when it commeth to the *Aire*, it exhaleth.

633 The *Iuyces* of *Fruits* are either *Watry*, or *Oyly*. I reckon amongst the *Watry*, all the *Fruits* out of which *Drinke* is expressed; As the *Grape*, the *Apple*, the *Peare*, the *Cherry*, the *Pomgranate*, &c. And there are some others, which, though they be not in use for *Drinke*, yet they appeare to be of the same *Nature*; As *Plums*, *Services*, *Mulberries*, *Rasps*, *Orenges*, *Limons*, &c. And for those *Iuyces*, that are so fleshy, as they cannot make *Drinke* by Expression, yet (perhaps) they may make *Drinke* by Mixture of *Water*;

Poculaq; admistis imitantur vitea Sorbis.

And it may bee *Heps* and *Brier-Berries* would doe the like. Those that have *Oyly Iuyce*, are; *Olives*, *Almonds*, *Nuts* of all sorts, *Pine-Apples*, &c. And their *Iuyces* are all *Inflammable*. And you must observe also, that some of the *Watry Iuyces*, after they have gathered *Spirit*, will Burne and Enflame; As *Wine*. There is a Third Kinde of *Fruit*, that is sweet, without either *Sharpnesse*, or *Oylinesse*: Such as is the *Fig*, and the *Date*.

634 It hath beene noted, that most *Trees*, and specially those that beare *Mast*, are fruitfull but once in two yeares. The *Cause* (no doubt) is, the *Expence* of *Sap*; For many *Orchard-Trees*, well Cultured, will beare divers yeares together.

635 There is no *Tree*, which besides the *Naturall Fruit*, doth beare so many *Bastard-Fruits*, as the *Oake* doth: For besides the *Acorne*, it beareth *Galls*, *Oake-Apples*, and certaine *Oake-Nuts*, which are Inflammable; And certaine *Oake-Berries*, sticking close to the *Body* of the *Tree*, without *Stalke*. It beareth also *Misseltoe*, though rarely. The *Cause* of all these may bee, the *Closenesse* and *Solidnesse* of the *Wood*, and *Pith* of the *Oake*; Which maketh severall *Iuyces* finde severall *Eruptions*. And therefore,

if

if you will deviſe to make any *Super-Plants*, you muſt ever give the *Sap* Plentifull Riſing, and Hard Iſſue.

636 There are two *Excreſcences*, which grow upon *Trees*; Both of them in the Nature of *Muſhromes*: The one the *Romans* called *Boletus*; Which groweth upon the *Roots* of *Oakes*; And was one of the *Dainties* of their *Table*; The other is *Medicinall*, that is called *Agaricke*, (whereof we have ſpoken before,) which groweth upon the Tops of *Oakes*; Though it be affirmed by ſome, that it groweth alſo at the *Roots*. I doe conceive, that many *Excreſcences* of *Trees* grow chiefly, where the *Tree* is dead, or faded; For that the *Naturall Sap* of the *Tree*, corrupteth into ſome *Preternaturall Subſtance*.

637 The greater Part of *Trees* beare *Moſt*, and *Beſt*, on the *Lower Boughs*; As *Oakes*, *Figs*, *Wall-Nuts*, *Peares*, &c. But ſome beare *Beſt* on the *Top-Boughes*; As *Crabs*, &c. Thoſe that beare beſt below, are ſuch, as Shade doth more good to, than Hurt. For generally all *Fruits* beare beſt loweſt; Becauſe the *Sap* tireth not, having but a ſhort Way: And therefore in *Fruits* ſpred upon *Walls*, the Loweſt are the Greateſt, as was formerly ſaid; So it is the *Shade* that hindereth the *Lower Boughes*; Except it bee in ſuch *Trees*, as delight in *Shade*; Or at leaſt beare it well. And therfore, they are either Strong *Trees*, as the *Oake*; Or elſe they have large *Leaves*, as the *Wallnut* and *Fig*; Or elſe they grow in *Pyramis*, as the *Peare*. But if they require very much *Sunne*, they beare beſt on the *Top*; As it is in *Crabs*, *Apples*, *Plums*, &c.

638 There be *Trees*, that beare beſt, when they begin to be *Old*; As *Almonds*, *Peares*, *Vines*, and all *Trees* that give *Maſt*. The *Cauſe* is, for that all *Trees*, that beare *Maſt*, have an *Oyly Fruit*; And *Young Trees* have a more *Watry Iuyce*, and leſſe Concocted; And of the ſame kinde alſo is the *Almond*. The *Peare* likewiſe, though it be not *Oyly*, yet it requireth much *Sap*, and well Concocted; For wee ſee it is a Heavy *Fruit*, and Solide; Much more than *Apples*, *Plums*, &c. As for the *Vine*, it is noted, that it beareth more *Grapes* when it is *Young*; But *Grapes* that make better *wine*, when it is *Old*; For that the *Iuyce* is better Concocted: And wee ſee that *wine* is Inflammable; So as it hath a kinde of *Oylineſſe*. But the moſt Part of *Trees*, amongſt which are *Apples*, *Plums*, &c. beare beſt when they are *Young*.

639 There be *Plants*, that have a *Milke* in them, when they are Cut; As *Figs*, *Old Lettuce*, *Sow-Thiſtles*, *Spurge*, &c. The *Cauſe* may be an *Inception* of *Putrefaction*; For thoſe *Milkes* have all an *Acrimony*; though one would thinke they ſhould be *Lenitive*. For if you write upon Paper, with the *Milke* of the *Fig*, the Letters will not be ſeene, untill you hold the Paper before the Fire, and then they wax Browne; Which ſheweth that it is a Sharpe or Fretting *Iuyce*: *Lettuce* is thought Poyſonous, when it is ſo *Old*, as to have *Milke*; *Spurge* is a kinde of Poyſon in it Selfe; And as for *Sow-Thiſtles*, though Coneyes eat them, yet Sheepe and Cattell will not touch them; And beſides, the *Milke* of them, rubbed upon Warts, in ſhort time, weareth them away: Which ſheweth the *Milke*

of

of them to be *Corrosive.* We see also, that *Wheat*, and other *Corne sowen*, if you take them forth of the *Ground*, before they sprout, are full of *Milke*; And the Beginning of *Germination* is ever a Kinde of *Putrefaction* of the *Seed. Euphorbium* also hath a *Milke*, though not very white, which is of a great *Acrimony.* And *Saladine* hath a yellow *Milke*, which hath likewise much *Acrimony*; For it cleanseth the *Eyes.* It is good also for *Cataracts.*

640 *Mushromes* are reported to grow, as well upon the *Bodies* of *Trees*, as upon their *Roots*, or upon the *Earth:* And especially upon the *Oake*. The *Cause* is, for that strong *Trees*, are towards such *Excrescences*, in the Nature of *Earth*; And therfore put forth *Mosse*, *Mushromes*, and the like.

641 There is hardly found a *Plant*, that yeeldeth a *Red Iuyce*, in the *Blade*, or *Eare*; Except it bee the *Tree* that beareth *Sanguis Draconis:* Which groweth (chiefly) in the *Island Soquotra:* The *Herb Amaranthus*, (indeed,) is *Red* all over; And *Brasill* is *Red* in the *wood:* And so is *Red Sanders.* That *Tree* of the *Sanguis Draconis*, groweth in the forme of a *Sugar-loafe.* It is like, that the *Sap* of that *Plant*, concocteth in the *Body* of the *Tree.* For wee see that *Grapes*, and *Pomegranats*, are *Red* in the *Iuyce*, but are *Greene* in the *Teare:* And this maketh the *Tree* of *Sanguis Draconis*, lesser towards the *Top*; Because the *Iuyce* hasteneth not up; And besides it is very *Astringent*, And therefore of Slow Motion.

642 It is reported, that *Sweet Mosse*, besides that upon the *Apple-Trees*, groweth likewise (sometimes) upon *Poplars*; And yet (generally) the *Poplar* is a Smooth *Tree* of *Barke*, and hath little *Mosse.* The *Mosse* of the *Larix Tree* burneth also sweet, and sparkleth in the Burning. *Quære* of the *Mosses* of *Odorate Trees*; As *Cedar*, *Cypres*, *Lignum Aloës*, &c.

643 The *Death* that is most without Paine, hath beene noted to be, upon the *Taking* of the *Potion* of *Hemlocke*; which in Humanity was the Forme of *Execution* of *Capitall Offenders* in *Athens.* The *Poyson* of the *Aspe*, that *Cleopatra* used, hath some affinity with it. The *Cause* is, for that the *Torments* of *Death* are chiefly raised by the Strife of the *Spirits*; And these *Vapours* quench the *Spirits* by *Degrees*; Like to the *Death* of an extreme Old Man. I conceive it is lesse Painfull than *Opium*, because *Opium* hath Parts of *Heat* mixed.

644 There be *Fruits*, that are *Sweet* before they be *Ripe*; As *Mirabolanes*; So *Fennell-Seeds* are Sweet before they ripen, and after grow Spicy. And some never *Ripen* to bee *Sweet*; As *Tamarinds*, *Barberries*, *Crabs*, *Slocs*, &c. The *Cause* is, for that the former Kinde have much and subtill *Heat*, which causeth Earely Sweetnesse; The latter have a *Cold* and *Acide Iuyce*, which no *Heat* of the *Sunne* can sweeten. But as for the *Mirabolane*, it hath Parts of Contrary *Natures*; For it is *Sweet*, and yet *Astringent.*

645 There bee few *Herbes* that have a *Salt Taste*; And contrariwise all *Bloud* of *Living Creatures* hath a *Saltnesse:* The *Cause* may bee, for that *Salt*, though it bee the *Rudiment* of *Life*, yet in *Plants* the Originall *Taste* remaineth

remaineth not; For you shall have them *Bitter*, *Sower*, *Sweet*, *Biting*, but seldome *Salt*: But in *Living Creatures*, all those High *Tastes* may happen to be (sometimes) in the *Humours*, but are seldome in the *Flesh*, or *Substance*; Because it is of a more *Oyly Nature*; which is not very Susceptible of those *Tastes*; And the *Saltnesse* it selfe of *Bloud*, is but a light, and secret *Saltnesse*: And even among *Plants*, some doe participate of *Saltnesse*, as *Alga Marina*, *Samphire*, *Scorvy-Grasse*, &c. And they report, there is, in some in the *Indian-Seas*, a *Swimming Plant*, which they call *Salgazus*, spreading over the *Sea*, in such sort, as one would thinke it were a *Meadow*. It is certaine, that out of the *Ashes*, of all *Plants*, they extract a *Salt*, which they use in *Medicines*.

646 It is reported by one of the *Ancients*, that there is an *Herb* growing in the *Water*, called *Lincostis*, which is full of *Prickles*: This *Herb* putteth forth another small *Herb* out of the *Leafe*; which is imputed to some *Moisture*, that is gathered betweene the *Prickles*, which Putrified by the *Sunne*, Germinateth. But I remember also I have seene, for a great Rarity, one *Rose* grow out of another, like *Honey-Suckles*, that they call *Top* and *Top-gallants*.

647 *Barley*, (as appeareth in the *Malting*,) being steeped in *water* three dayes, and afterwards the *Water* drained from it, and the *Barley* turned upon a dry floare, will sprout, halfe an Inch long at least: And if it bee let alone, and not turned, much more; untill the Heart bee out. *Wheat* will doe the same. Try it also with *Pease*, and *Beanes*. This *Experiment* is not like that of the *Orpin*, and *Semper-Vive*; For there it is of the old Store, for no *Water* is added; But here it is nourished from the *Water*. The *Experiment* would bee further driven: For it appeareth already, by that which hath beene said, that *Earth* is not necessary to the first Sprouting of *Plants*; And wee see that *Rose-Buds* set in *Water*, will Blow: Therefor try whether the *Sprouts* of such *Graines* may not be raised to a further Degree; As to an *Herb*, or *Flower*, with *Water* onely; Or some small commixture, of *Earth*: For if they will, it should seeme by the *Experiments* before, both of the *Malt*, and of the *Roses*, that they will come far faster on in *Water*, than in *Earth*: For the *Nourishment* is easilier drawne out of *Water*, than out of *Earth*. It may give some light also, that *Drinke* infused with *Flesh*, as that with the *Capon*, &c. will nourish faster and easilier, than *Meat* and *Drinke* together. Try the same *Experiment* with *Roots*, as well as with *Graines*: as for Example, take a *Turnip*, and steepe it a while, and then dry it, and see whether it will sprout.

648 *Malt* in the *Drenching* will swell; And that in such a manner, as after the Putting forth in Sprouts, and the drying upon the Keele, there will be gained at least a Bushell in eight, and yet the Sprouts are rubbed off; And there will be a Bushell of *Dust* besides the *Malt*: Which I suppose to be, not onely by the loose, and open Laying of the *Parts*, but by some Addition of *Substance*, drawne from the *Water*, in which it was steeped.

649 *Malt* gathereth a *Sweetnesse* to the *Taste*, which appeareth yet more in

in the *Wort*. The *Dulcoration* of *Things* is worthy to be tried to the full; For that *Dulcoration* importeth a degree to *Nourishment*: And the Making of *Things Inalimentall*, to become *Alimentall*, may be an *Experiment* of great Profit, for Making new *Victuall*.

Most *Seeds* in the Growing, leave their *Huske* or *Rinde* about the *Root*; But the *Onion* will carry it vp, that it will be like a Cap vpon the Top of the *Young Onion*. The *Cause* may be, for that the *Skin* or *Huske* is not easie to breake; As we see by the Pilling of *Onions*, what a Holding *Substance* the *Skin* is. 650

Plants, that have *Curled Leaves*, doe all abound with *Moysture*; Which commeth so fast on, as they cannot spread themselves Plaine, but must needs gather together. The Weakest Kinde of *Curling* is *Roughnesse*; As in *Clary*, and *Burre*. The Second is *Curling* on the Sides; As in *Lettuce*, and *Young Cabbage*: And the Third is *Folding* into an *Head*; As in *Cabbage* full growne, and *Cabbage-Lettuce*. 651

It is reported, that *Firre*, and *Pine*, especially if they be *Old* and *Putrified*, though they shine not, as some *Rotten Woods* doe, yet in the sudden *Breaking* they will sparkle like Hard *Sugar*. 652

The *Roots* of *Trees* doe, (some of them,) put downwards deepe into the *Ground*; As the *Oake*, *Pine*, *Firre*, &c. Some spread more towards the *Surface* of the *Earth*; As the *Ash*, *Cypresse-Tree*, *Olive*, &c. The *Cause* of this latter may be, for that such *Trees* as love the *Sunne*, doe not willingly descend farre into the *Earth*; And therfore they are (commonly) *Trees*, that shoot vp much; For in their *Body*, their desire of Approach to the *Sunne*, maketh them spread the lesse. And the same Reason, under *Ground*, to avoid Recesse from the *Sunne*, maketh them spread the more. And wee see it commeth to passe in some *Trees*, which have beene planted too deep in the *Ground*, that for love of Approach to the *Sunne*, they forsake their first *Root*, and put out another more towards the *Top* of the *Earth*. And we see also, that the *Olive* is full of *Oylie Iuyce*; And *Ash* maketh the best Fire; And *Cypresse* is an *Hot Tree*. As for the *Oake*, which is of the former sort, it loveth the *Earth*; And therefore groweth slowly. And for the *Pine*, and *Firre* likewise, they have so much *Heat* in themselves, as they need lesse the *Heat* of the *Sunne*. There be *Herbs* also that have the same difference; As the *Herb* they call *Morsus Diaboli*; which putteth the *Root* downe so low, as you cannot pull it up without *Breaking*; Which gave Occasion to the *Name*, and *Fable*; For that it was said, it was so wholsome a *Root*, that the *Devill*, when it was gathered, bit it for *Envy*: And some of the *Ancients* doe report, that there was a Goodly *Firre*, (which they desired to remove whole,) that had a *Root* under *Ground* eight Cubits deepe; And so the *Root* came up broken. 653

It hath beene observed, that a *Branch* of a *Tree*, being *Vnbarked* some space at the Bottome, and so set into the *Ground*, hath growen; even of such *Trees*, as if the *Branch* were set with the *Barke* on, they would not grow; yet contrariwise we see, that a *Tree* Pared round in the *Body*, above 654

Ground, will die. The *Cauſe* may be, for that the *Vnbarkt Part* draweth the Nouriſhment beſt, but the *Barke* continueth it only.

655 *Grapes* will continue *Freſh*, and *Moiſt*, all Winter long, if you hang them, *Cluſter* by *Cluſter*, in the *Roofe* of a *Worme Roome*; Eſpecially, if when you gather the *Cluſter*, you take off with the *Cluſter* ſome of the *Stocke*.

656 The *Reed* or *Cane* is a *Watry Plant*, and groweth not but in the *Water*; It hath theſe Properties; That it is *Hollow*; That it is *Knuckled* both *Stalke*, and *Root*; That being *Drie*, it is more *Hard* and *Fragile*, than other *Wood*, That it putteth forth no *Boughs*, though many *Stalks* come out of one *Root*. It differeth much in greatneſſe; The ſmalleſt being fit for Thatching of Houſes; And Stopping the Chinkes of Ships; Better than Glew, or Pitch. The Second Bigneſſe, is uſed for Angle Rods, and Staves; And in *China* for bearing of Offenders upon the Thighs. The differing *Kinds* of them are; The *Common Reed*; The *Caſſia Fiſtula*; And the *Sugar Reed*. Of all *Plants*, it boweth the eaſieſt, and riſeth againe. It ſeemeth, that amongſt *Plants*, which are nouriſhed with *Mixture* of *Earth* and *Water*, it draweth moſt Nouriſhment from *Water*; which maketh it the *Smootheſt* of all others in *Barke*; And the *Holloweſt* in *Body*.

657 The *Sap* of *Trees*, when they are let *Bloud*, is of differing *Natures*. Some more *Watry* and *Cleare*; As that of *Vines*; of *Beeches*; of *Peares*. Some *Thicke*; As *Apples*. Some *Gummy*; as *Cherries*. Some *Froathie*, As *Elmes*. Some *Milkie*; As *Figs*. In *Mulberries*, the *Sap* ſeemeth to be (almoſt) towards the *Barke* only; For if you cut the *Tree* a little into the *Barke*, with a *Stone*, it will come forth; If you pierce it deeper with a *Toole*, it will be drie. The *Trees*, which have the *Moiſteſt Iuyces* in their *Fruit*, have commonly the *Moiſteſt Sap* in their *Body*; For the *Vines* and *Peares* are very *Moiſt*; *Apples* ſomewhat more *Spongie*: The *Milke* of the *Figge* hath the Qualitie of the *Rennet*, to gather *Cheeſe*: And ſo have certaine *Soure Herbs* wherewith they make *Cheeſe* in *Lent*.

658 The *Timber* and *Wood* are, in ſome *Trees*, more *Cleane*, in ſome more *Knottie*; And it is a good Triall, to trie it by Speaking at one End, and Laying the Eare at the Other: For if it be *Knottie*, the Voice will not paſſe well. Some have the *Veines* more varied and chamloted; As *Oake*, whereof *Wainſcot* is made; *Maple*, whereof *Trenchers* are made; Some more ſmooth, as *Firre*, and *Walnut*: Some doe more eaſily breed *Wormes* and *Spiders*; Some more hardly, as it is ſaid of *Iriſh Trees*: Beſides there bee a Number of Differences that concerne their Vſe; As *Oake*, *Cedar*, and *Cheſnut*, are the beſt Builders; Some are beſt for *Plough-Timber*; As *Aſh*; Some for *Peeres*, that are ſometimes wet, and ſometimes drie; As *Elme*: Some for *Planchers*; As *Deale*: Some for *Tables*, *Cupboards*, and *Desks*; As *Walnuts*: Some for *Ship-Timber*; As *Oakes* that grow in *Moiſt Grounds*; For that maketh the *Timber* Tough, and not apt to rift with *Ordnance*; Wherein *Engliſh* and *Iriſh Timber* are thought to excell: Some for *Maſts* of *Ships*; As *Firre*, and *Pine*, becauſe of their

Length,

Length, Straightneſſe, and Lightneſſe: Some for *Pale*; As *Oake*: Some for *Fuell*; As *Aſh*: And ſo of the reſt.

The *Comming* of *Trees* and *Plants* in certaine *Regions*, and not in others, is ſometimes *Caſuall*: For many have beene tranſlated, and have proſpered well; As *Damaske-Roſes*, that have not beene knowne in *England* above an hundred yeares, and now are ſo common. But the liking of *Plants* in certaine *Soiles*, more than in others, is meerely *Naturall*; As the *Firre* and *Pine* love the Mountaines; The *Poplar*, *Willow*, *Sallow*, and *Alder*, love *Rivers*, and *Moiſt Places*: The *Aſh* loveth *Coppices*; But is beſt in *Standards* alone: *Iuniper* loveth *Chalke*; And ſo doe moſt *Fruit-Trees*: *Sampire* groweth but upon *Rocks*: *Reeds* and *Oſiers* grow where they are waſhed with *Water*: The *Vine* loveth Sides of *Hills*, turning upon the *South-Eaſt-Sunne*, &c. 659

The *Putting forth* of certaine *Herbs* diſcovereth of what Nature the *Ground* where they put forth, is: As *Wilde Thyme* ſheweth good *Feeding Ground* for *Cattell*: *Betony* and *Strawberries* ſhew *Grounds* fit for Wood: *Camomill* ſheweth Mellow *Grounds* fit for *Wheat*. *Muſtard-Seed*, growing after the *Plough*, ſheweth a good *Strong Ground* alſo for *Wheat*: *Burnet* ſheweth good *Meadow*: And the like. 660

There are found, in divers *Countries*, ſome other *Plants*, that grow out of *Trees*, and *Plants*, beſides *Miſſeltoe*: As in *Syria*, there is an *Herb* called *Caſſyta*, that groweth out of tall *Trees*, and windeth it ſelfe about the ſame *Tree* where it groweth; And ſometimes about *Thornes*. There is a kinde of *Polypode*, that groweth out of *Trees*, though it windeth not. So likewiſe an *Herbe* called *Raunos*, upon the *Wilde Olive*. And an *Herbe* called *Hippophæſton* upon the *Fullers Thorne*; Which, they ſay, is good for the *Falling-Sickneſſe*. 661

It hath beene obſerved, by ſome of the *Ancients*, that howſoever *Cold* and *Eaſterly Winds*, are thought to be great Enemies to *Fruit*; yet nevertheleſſe *South-Winds* are alſo found to doe Hurt; Eſpecially in the *Bleſſoming* time; And the more, if *Showers* follow. It ſeemeth, they call forth the *Moiſture* too faſt. The *Weſt winds* are the beſt. It hath beene obſerved alſo that *Greene* and *Open Winters* doe hurt *Trees*; Inſomuch as if two or three ſuch *Winters* come together, *Almond-Trees*, and ſome other *Trees*, will dye. The *Cauſe* is the ſame with the former, becauſe the *Luſt* of the *Earth* overſpendeth it ſelfe; Howſoever ſome other of the *Ancients* have commended *warme Winters*. 662

Snowes, lying long, cauſe a *Fruitfull Yeare*, For firſt, they keepe in the *Strength* of the *Earth*; Secondly, they water the *Earth*, better than *Raine*; For in *Snow*, the *Earth* doth (as it were) ſucke the *Water*, as out of the *Teat*. Thirdly, the *Moiſture* of *Snow* is the fineſt *Moiſture*; For it is the *Froth* of the *Cloudy Waters*. 663

Showers, if they come a little before the *Ripening* of *Fruits*, doe good to all *Succulent* and *Moiſt Fruits*; As *Vines*, *Olives*, *Pomegranates*; Yet it is rather for Plenty, than for Goodneſſe; For the beſt *Wines* are in the Drieſt *Vintages*: *Small Showers* are likewiſe good for *Corne*, ſo as 664

Parching Heats come not upon them. Generally, *Night-Showers* are better than *Day-Showers*; For that the *Sunne* followeth not so fast upon them: and we see, even in *Watring* by the *Hand*, it is best, in *Summer time*, to water in the *Evening*.

665 The *Differences* of *Earths*, and the *Triall* of them, are worthy to be diligently inquired. The *Earth*, that with *Showers* doth easilieſt *Soften*, is commended; And yet some *Earth* of that kinde will be very Dry, and Hard before the *Showers*. The *Earth* that casteth up from the *Plough*, a great *Clod*, is not so good, as that, which casteth up a Smaller *Clod*. The *Earth*, that putteth forth *Mosse* easily, and may bee called *Mouldie*, is not good. The *Earth*, that smelleth well upon the Digging, or Ploughing, is commended; As containing the *Iuyce* of *Vegetables* almost already prepared. It is thought by some, that the *Ends* of low *Raine-bowes*, fall more upon one kinde of *Earth* than upon another: As it may well bee; For that that *Earth* is most *Roscide*: And therfore it is commended for a Signe of good *Earth*. The *Poorenesse* of the *Herbs*, (it is plaine,) shew the *Poorenesse* of the *Earth*; And especially if they be in *Colour* more darke: But if the *Herbs* shew *Withered*, or *Blasted* at the Top, it sheweth the *Earth* to be very *Cold*: And so doth the *Mossinesse* of *Trees*. The *Earth*, whereof the *Grasse* is soone *Parched* with the *Sun*, and *Toasted*, is commonly *Forced Earth*, and Barren in his owne Nature. The *Tender*, *Chessome*, and *Mellow Earth*, is the best; Being meere *Mould*, betweene the two Extreames of *Clay*, and *Sand*; Especially if it be not *Loamy*, and *Binding*. The *Earth*, that after *Raine*, will scarce be *Ploughed*, is commonly *Fruitfull*; For it is *Cleaving*, and full of *Iuyce*.

666 It is strange, which is observed by some of the *Ancients*, that *Dust* helpeth the *Fruitfulnesse* of *Trees*; and of *Vines*, by name: Insomuch as they cast Dust upon them of purpose. It should seeme, that that Powdring, when a Shower commeth, maketh a kinde of Soyling to the *Tree*, being *Earth* and *Water*, finely layd on. And they note, that Countries, where the *Fields* and *Wayes* are *Dusty*, beare the best *Vines*.

667 It is commended by the *Ancients*, for an Excellent *Helpe* to *Trees*, to lay the *Stalkes* and *Leaves* of *Lupines* about the *Roots*; Or to Plough them into the *Ground*, where you will sow *Corne*. The *Burning* also of the *Cuttings* of *Vines*, and *Casting* them upon *land*, doth much Good. And it was generally received of old, that *Dunging* of *Grounds*, when the *West Wind* bloweth, and in the *Decrease* of the *Moone*, doth greatly helpe; The *Earth* (as it seemeth) being then more thirsty, and open, to receive the *Dung*.

668 The *Grafting* of *Vines* upon *Vines*, (as I take it,) is not now in use: The *Ancients* had it, and that three wayes: The first was *Insition*, which is the Ordinary manner of *Grafting*: The Second was *Terebration*, through the *Middle* of the *Stocke*, and putting in the *Cions* there: And the Third was Paring of two *Vines*, that grow together, to the *Marrow*, and Binding them close.

669 The *Diseases* and ill *Accidents* of *Corne*, are worthy to be enquired; And

And would be more worthy to be enquired, if it were in Mens Power to help them; Whereas many of them are not to be remedied. The *Mill-dew* is one of the Greateſt; which (out of queſtion) commeth by *Cloſeneſſe* of *Aire*; And therefore in *Hills*, or large *Champaigne Grounds*, it ſeldome commeth; Such as is with us *York's Woald*. This cannot be remedied, otherwiſe than that in *Countries* of Small Encloſure, the *Grounds* be turned into larger *Fields*: Which I have knowne to doe good in ſome Farmes. Another *Diſeaſe* is the *Putting forth* of *Wilde Oats*, whereinto *Corne* oftentimes, (eſpecially *Barley*,) doth degenerate. It happeneth chiefly from the *Weakneſſe* of the *Graine* that is ſowen; For if it be either too Old, or Mouldy, it will bring forth *wilde Oats*. Another *Diſeaſe* is the *Sacietie* of the *Ground*; For if you ſow one *Ground* ſtill with the ſame *Corne*, (I meane not the ſame *Corne* that grew upon the ſame *Ground*,) but the ſame *Kinde* of *Graine*; (As *Wheat*, *Barley*, &c. it will proſper but poorely: Therefore beſides the *Reſting* of the *Ground*, you muſt varie the *Seed*. Another ill *Accident* is, from the *Winds*, which hurt at two times; At the *Flowring*, by *Shaking* off the *Flowers*; And at the full *Ripening*, by *Shaking* out the *Corne*. Another ill *Acciaent* is, *Drouth*, at the *Spindling* of the *Corne*; Which with us is rare; But in Hotter *Countries*, common: Inſomuch as the Word, *Calamitas*, was firſt derived from *Calamus*, when the *Corne* could not get out of the *Stalke*. Another ill *Accident* is, *Over-wet* at *Sowing-Time*; which with us breedeth much *Dearth*; Inſomuch as the *Corne* never commeth up; And (many times) they are forced to reſow *Sommer-Corne*, where they ſowed *Winter-Corne*. Another ill *Accident* is *Bitter Froſts*, continued, without *Snow*; Eſpecially in the Beginning of the *Winter*, after the *Seed* is new Sowen. Another *Diſeaſe* is *Wormes*; which ſometimes breed in the *Root*, and happen upon Hot *Sunnes*, and *Showers*, immediately after the *Sowing*; And another *Worme* breedeth in the *Eare* it Selfe; Eſpecially when *Hot Sunnes* breake often out of *Clouds*. Another *Diſeaſe* is *Weeds*; And they are ſuch, as either Choake, and Overſhadow the *Corne*, and beare it downe; Or ſtarve the *Corne*, and deceive it of Nouriſhment. Another *Diſeaſe* is, *Over-Ranckneſſe* of the *Corne*; Which they uſe to remedy, by *Mowing it* after it is come up; Or putting *Sheepe* into it. Another ill *Accident* is *Laying* of *Corne* with great *Raines*, neare, or in *Harveſt*. Another ill *Accident* is, if the *Seed* happen to have touched *Oyle*, or any *Thing*, that is *Fat*; For thoſe *Subſtances* have an *Antipathy* with *Nouriſhment* of *Water*.

The *Remedies* of the *Diſeaſes* of *Corne* have beene obſerved as followeth. The *Steeping* of the *Graine*, before *Sowing*, a little time in *Wine*, is thought a *Preſervative*: The *Mingling* of *Seed-Corne* with *Aſhes*, is thought to be good: The *Sowing* at the *Wane* of the *Moone*, is thought to make the *Corne* ſound: It hath not beene practiſed, but it is thought to be of uſe, to make ſome *Miſcellane* in *Corne*; As if you ſow a few *Beanes* with *Wheat*, your *Wheat* will be the better. It hath been obſerved, that the *Sowing* of *Corne* with *Houſleeke*, doth good. Though *Graine*, that

toucheth *Oyle*, or *Fat*, receiveth hurt, yet the *Steeping* of it, in the *Dregs* of *Oyle*, when it beginneth to Putrifie, (which they call *Amurca*,) is thought to assure it against *Wormes*. It is reported also, that if *Corne* be *Mowed*, it will make the *Graine* Longer, but Emptier, and having More of the *Husk*.

671 It hath beene noted, that *Seed* of a yeare old, is the Best; And of two or three yeares is worse; And that which is more Old, is quite Barren; Though (no doubt) some *Seeds* and *Graines* last better than others. The *Corne*, which in the *Vanning* lieth lowest, is the best; And the *Corne*, which broken or bitten retaineth a little *Yellownesse*, is better than that which is very *White*.

672 It hath beene observed, that of all *Roots* of *Herbs*, the *Root* of *Sorrell* goeth the furthest into the *Earth*; Insomuch as it hath bin knowne to go three Cubits deepe; And that it is the *Root* that continueth fit (longest) to be set againe, of any *Root* that groweth. It is a *Cold* and *Acide Herb*, that (as it seemeth) loveth the *Earth*, and is not much drawne by the *Sunne*.

673 It hath beene observed, that some *Herbs* like best, being watred with *Salt-Water*; And *Radish*, *Beet*, *Rew*, *Pennyroyall*; This Triall would be extended to some other *Herbs*; Especially such as are Strong; As *Tarragon*, *Mustard-Seed*, *Rocket*, and the like.

674 It is strange that is generally received, how some *Poysonous Beasts* affect *Odorate* and *Wholsome Herbs*; As that the *Snake* loveth *Fennell*; That the *Toad* will be much under *Sage*; That *Frogs* will be in *Cinquefoile*. It may be, it is rather the *Shade*, or other Coverture, that they take liking in, than the Vertue of the *Herb*.

675 It were a Matter of great Profit, (save that I doubt it is too Conjecturall to venture upon,) if one could discerne, what *Corne*, *Herbs*, or *Fruits*, are like to be in *Plenty*, or *Scarcity*, by some *Signes* and *Prognosticks*, in the Beginning of the Yeare: For as for those, that are like to bee in *Plenty*, they may be bargained for, upon the *Ground*; As the Old Relation was of *Thales*; who to shew how easie it was for a *Philosopher* to bee rich, when he fore-saw a great *Plenty* of *Olives*, made a *Monopoly* of them. And for *Scarcity*, Men may make Profit in keeping better the Old Store. Long *Continuance* of *Snow* is beleeved to make a *Fruitfull Yeare* of *Corne*: An *Early Winter*, or a very *Late Winter*, a *Barren Yeare* of *Corne*: An Open and Serene *Winter*, an ill Yeare of *Fruit*: These we have partly touched before: But other *Prognostickes* of like Nature are diligently to bee enquired.

676 There seeme to be, in some *Plants*, *Singularities*, wherein they differ from all Other; The *Olive* hath the *Oyly Part*, only on the *Outside*; Whereas all other *Fruits* have it in the *Nut*, or *Kernell*. The *Firre* hath (in effect) no *Stone*, *Nut*, nor *Kernell*; Except you will count the little *Graines Kernells*. The *Pomegranate* and *Pine-Apple* have onely, amongst *Fruits*, *Graines* distinct in severall *Cells*. No *Herbs* have *Curled Leaves*, but *Cabbage*, and *Cabbage-Lettuce*. None have double *Leaves*, one belong to the

the *Stalke*, another to the *Fruit* or *Seed*, but the *Artichoke*: No *Flower* hath that kinde of Spread that the *Woodbine* hath. This may be a large Field of Contemplation; For it sheweth that in the Frame of *Nature*, there is, in the Producing of some *Species*, a Composition of Matter, which happeneth oft, and may be much diversified: In others, such as happeneth rarely, and admitteth little Variety: For so it is likewise in *Beasts*: *Dogs* have a Resemblance with *Wolves*, and *Foxes*; *Horses* with *Asses*; *Kine* with *Buffles*; *Hares* with *Coneyes*; &c. And so in *Birds*: *Kites* and *Kestrells* have a Resemblance with *Hawkes*; *Common-Doves* with *Ring-Doves*, and *Turtles*; *Black-Birds* with *Thrushes*, and *Mavisses*; *Crowes* with *Ravens*, *Dawes*, and *Choughes*, &c. But *Elephants*, and *Swine* amongst *Beasts*; And the *Bird* of *Paradise*, and the *Peacocke* amongst *Birds*; And some few others; have scarce any other *Species*, that have Affinity with them.

We leave the *Discription* of *Plants*, and their *Vertues*, to *Herballs*, and other like *Bookes* of *Naturall History*: Wherein *Mens Diligence* hath beene great, even to *Curiosity*: For our *Experiments* are only such, as doe ever ascend a Degree to the *Deriving* of *Causes*, and *Extracting* of *Axiomes*, which, wee are not ignorant; but that some, both of the *Ancient*, and *Moderne Writers*, have also laboured; But their *Causes*, and *Axiomes*, are so full of Ignagination, and so infected with the old Received *Theories*, as they are meere *Inquinations* of *Experience*, and Concoct it not.

Experiment Solitary, touching *Healing* of *Wounds*. 677

IT hath beene observed, by some of the *Ancients*, that *Skins*, (especially of *Rames*,) newly pulled off, and applied to the *Wounds* of *Stripes*, doe keepe them from Swelling, and Exulcerating; And likewise Heale them, and Close them up; And that the *Whites* of *Eggs* doe the same. The *Cause* is a Temperate *Conglutination*; For both *Bodies* are Clammy, and Viscous, and doe bridle the *Defluxe* of *Humours* to the Hurts, without Penning them in too much.

Experiment Solitary, touching *Fat diffused* in *Flesh*. 678

YOu may turne (almost) all *Flesh* into a *Fatty Substance*, if you take *Flesh*, and cut it into Peeces, & put the Peeces into a *Glasse* covered with Parchment; And so let the *Glasse* stand six or seven Houres in *Boyling Water*. It may be and *Experiment* of Profit, for Making of *Fat*, or *Grease*, for many uses; But then it must be of such *Flesh* as is not Edible; As *Horses*, *Dogs*, *Beares*, *Foxes*, *Badgers*, &c.

It

Experiment Solitary, touching *Ripening* of *Drinke* before the *Time*.

679

IT is reported by one of the *Ancients*, that *New Wine*, put into *Veſſells* well ſtopped, and the *Veſſells* let down into the *Sea*, will accelerate very much; the Making of them Ripe, and Potable. The ſame would be tried in *Wort*.

Experiment Solitary, touching *Piloſitie* and *Plumage*.

680

Beaſts are more *Hairy* than *Men*; And *Savage Men* more than *Civill*; And the *Plumage* of *Birds* exceedeth the *Piloſity* of *Beaſts*. The *Cauſe* of the Smoothneſſe in *Men*, is not any Abundance of *Heat*, and *Moiſture*, though that indeed cauſeth *Piloſity*; But there is requiſite to *Piloſity*, not ſo much *Heat* and *Moiſture* as *Excrementitious Heat* and *Moiſture*: (For whatſoever aſſimilateth, goeth not into the *Haire*:) And *Excrementitious Moiſture* aboundeth moſt in *Beaſts*, and *Men* that are more *Savage*. Much the ſame Reaſon is there of the *Plumage* of *Birds*; For *Birds* aſſimilate leſſe, and excerne more than *Beaſts*: For their *Excrements* are ever liquid, and their *Fleſh* (generally) more dry: Beſide, they have not *Inſtruments* for *Vrine*; And ſo all the *Excrementitious Moiſture* goeth into the *Feathers*: And therefore it is no Marvell, though *Birds* bee commonly better Meat than *Beaſts*, becauſe their *Fleſh* doth aſſimilate more finely, and ſecerneth more ſubtilly. Againe, the *Head* of *Man* hath *Haire* upon the *firſt Birth*, which no other *Part* of the *Body* hath. The *Cauſe* may bee *Want* of *Perſpiration*: For Much of the Matter of *Haire*, in the other *Parts* of the *Body*, goeth forth by Inſenſible *Perſpiration*; And beſides, the *Skull* being of a more ſolide Subſtance, nouriſheth and aſſimilateth leſſe, and excerneth more: And ſo likewiſe doth the *Chinne*; We ſee alſo that *Haire* commeth not upon the *Palmes* of the *Hands*, nor *Soales* of the *Feet*; Which are *Parts* more *Perſpirable*. And *Children* likewiſe are not *Hairy*, becauſe that their *Skins* are more *Perſpirable*.

Experiment Solitary, touching the *Quickneſſe* of *Motion* in *Birds*.

681

Birds are of *Swifter Motion* than *Beaſts*: For the *Flight* of many *Birds* is *Swifter*, than the *Race* of any *Beaſts*. The *Cauſe* is, for that the *Spirits* in *Birds*, are in greater Proportion, in compariſon of the Bulke of their Body, than in *Beaſts*: For as for the Reaſon that ſome give, that they are partly Carried, whereas *Beaſts* goe, that is Nothing; For by that Reaſon Swimming ſhould be ſwifter, than Running: And that Kinde of *Carriage* alſo, is not without Labour of the *Wing*.

Experiment Solitary, touching the different *Clearneſſe* of the *Sea*.

682

THe *Sea* is *Clearer*, when the *North-Wind* bloweth, than when the *South-Wind*. The *Cauſe* is, for that *Salt-Water* hath a little *Oylineſſe* in the *Surface* thereof; As appeareth in verie Hot Dayes: And againe, for that the *Southerne Wind* relaxeth the *Water* ſomewhat; As no *Water Boyling* is ſo Cleare as *Cold Water*.

Experiment Solitary, touching the different *Heats* of *Fire* and *Boyling Water*.

683

Fire burneth *Wood*, making it firſt *Luminous*; Then *Black* and *Brittle*; And laſtly, *Broken* & *Incinerate*: *Scalding Water* doth none of theſe. The *Cauſe* is, for that by *Fire*, the *Spirit* of the *Body* is firſt *Refined*, and then *Emitted*; Whereof the *Reſining*, or Attenuation cauſeth the *Light*;

And

And the *Emission*, first the *Fragilitie*, and after the *Dissolution* into *Ashes*: Neither doth any other *Body* enter: But in *Water* the *Spirit* of the *Body* is not *Refined* so much; And besides Part of the *Water* entreth; Which doth increase the *Spirit*, and in a degree extinguish it: Therfore we see that *Hot Water* will quench *Fire*. And againe we see, that in *Bodies*, wherein the *Water* doth not much enter, but only the *Heat* passeth, *Hot Water* worketh the Effects of *Fire*: As in *Egges Boyled*, and *Roasted*; (into which the *Water* entreth not at all,) there is scarce difference to bee discerned; But in *Fruit*, and *Flesh*, whereinto the *Water* entreth, in some Part, there is much more difference.

THe *Bottome* of a *Vessel* of *Boiling Water*, (as hath bin observed,) is not very much *Heated*; So as Men may put their *Hand* under the *Vessel*, and remove it. The *Cause* is, for that the *Moisture* of *Water*, as it quencheth Coales, where it entreth; So it doth allay Heat, where it toucheth: And therfore note well, that *Moisture*, although it doth not passe thorow *Bodies*, without *Communication* of some *Substance*, (As *Heat* and *Cold* doe;) yet it worketh manifest Effects; not by Entrance of the Body, but by Qualifying of the Heat, and Cold; As wee see in this *Instance*: And we see likewise, that the *Water* of *Things distilled* in *Water*, (which they call the *Bath*,) differeth not much from the *Water* of *Things Distilled* by *Fire*: Wee see also, that *Pewter-Dishes*, with *Water* in them, will not Melt easily; But without it, they will: Nay she see more, that *Butter*, or *Oile*, which in themselves are [illegible]nable, yet by Vertue of their *Moisture*; will doe the like.

Experiment Solitary, touching the *Qualification* of *Heat* by *Moisture*. 684.

IT hath beene noted by the *Ancients*, that it is dangerous to Pick ones *Eare*, whilest he *Yawneth*. The *Cause* is, for that in *Yawning*, the Inner *Parchment* of the *Eare* is extended, by the *Drawing* in of the *Spirit*, and *Breath*; For in *Yawning*, and *Sighing* both, the *Spirit* is first strongly Drawne in, and then strongly Expelled.

Experiment Solitary, touching *Yawning*. 685

IT hath beene observed by the *Ancients*, that *Sneezing* doth cease the *Hiccough*. The *Cause* is, for that the *Motion* of the *Hiccough* is a *Lifting up* of the *Stomacke*; which *Sneezing* doth somewhat depresse, and divert the *Motion* another way. For first we see, that the *Hiccough* commeth of *Fulnesse* of *Meat*, (especially in *Children*,) which causeth an Extension of the *Stomacke*: Wee see also, it is caused by *Acide Meats*, or *Drinkes*, which is by the *Pricking* of the *Stomacke*: And this *Motion* is ceased either by *Diversion*; Or by *Detention* of the *Spirits*: *Diversion*, as in *Sneezing*; *Detention*, as we see *Holding* of the *Breath*, doth helpe somewhat to cease the *Hiccough*: And putting a Man into an Earnest Study doth the like: As is commonly used: And *Vinegar* put to the *Nosthrills*, or *Gargarized*, doth it also; For that it is *Astringent*, and inhibiteth the *Motion* of the *Spirits*.

Experiment Solitary, touching the *Hiccough*. 686

Looking

Experiment Solitary, touching Sneezing. 687

LOoking against the *Sunne*, doth induce *Sneezing*. The *Cause* is, not the *Heating* of the *Nosthrils*; For then the *Holding* up of the *Nostrills* against the *Sunne*, though one Winke, would doe it; But the *Drawing* downe of the *Moisture* of the *Braine*: For it will make the *Eyes* run with *Water*; And the *Drawing* of *Moisture* to the *Eyes*, doth draw it to the *Nosthrills*, by *Motion* of *Consent*; And so followeth *Sneezing*; As contrariwise, the *Tickling* of the *Nosthrills* within, doth draw the *Moisture* to the *Nosthrills*, and to the *Eyes* by *Consent*; For they also will *Water*. But yet, it hath beene observed, that if one be about to *Sneeze*, the Rubbing of the *Eyes*, till they run with Water, will prevent it. Whereof the *Cause* is, for that the *Humour*, which was descending to the *Nosthrills*, is diverted to the *Eyes*.

Experiment Solitary, touching the Tenderneſſe of the Teeth. 688

THe *Teeth* are more, by *Cold Drinke*, or the like, affected, than the other *Parts*. The *Cause* is double: The One, for that the *Resistance* of *Bone* to *Cold*, is greater than of *Flesh*; for that the *Flesh* shrinketh, but the *Bone* resisteth, whereby the *Cold* becommeth more eager: The Other is, for that the *Teeth* are *Parts* without *Bloud*; Whereas *Bloud* helpeth to qualifie the *Cold*: And therefore we see, that the *Sinnewes* are much affected with *Cold*; For that they are *Parts* without *Bloud*: So the *Bones* in Sharpe *Colds* wax *Brittle*: And therefore it hath beene seene, that all *Contusions* of *Bones*, in *Hard Weather*, are more difficult to Cure.

Experiment Solitary, touching the Tongue. 689

IT hath beene noted, that the *Tongue* receiveth, more easily, *Tokens* of *Diseases*, than the other *Parts*; As of *Heats* within, which appeare most in the *Blackneſſe* of the *Tongue*. Againe, *Pied Cattell* are spotted in their *Tongues*, &c. The *Cause* is, (no doubt,) the *Tenderneſſe* of the *Part*, which thereby receiveth more easily all *Alterations*, than any other *Parts* of the *Flesh*.

Experiment Solitary, touching the Taſte. 690

WHen the *Mouth* is out of *Taste*, it maketh Things taste, sometimes *Salt*; Chiefely *Bitter*; And sometimes *Loathsome*; But never *Sweet*. The *Cause* is, the *Corrupting* of the *Moisture* about the *Tongue*; Which many times turneth *Bitter*, and *Salt*, and *Loathsome*; But *Sweet* never; For the rest are *Degrees* of *Corruption*.

Experiment Solitary, touching some Prognosticks of Peſtilentiall Seasons. 691

IT was observed in the *Great Plague* of the last Yeare, that there were seene, in divers *Ditches*, and low *Grounds*, about *London*, many *Toads*, that had *Tailes*, two or three Inches long, at the least; Whereas *Toads* (usually) have no *Tailes* at all. Which argueth a great Disposition to *Putrefaction* in the *Soile*, and *Aire*. It is reported likewise, that *Roots*, (such as *Carrets*, and *Parsnips*,) are more *Sweet*, and *Lushious*, in Infectious Yeares, than in other Yeares.

Experiment Solitary, touching Speciall Simples for Medicines. 692

WIse *Physitians* should with all diligence inquire, what *Simples* Nature yeeldeth, that have extreme *Subtile Parts*, without any *Mor-*

dication,

dication, or *Acrimony:* For they undermine that which is *Hard*; They open that which is *Stopped*, & *Shut*; And they expel that which is *Offensive*, gently, without too much *Perturbation*. Of this Kind are *Elder-Flowers*, which therefore are Proper for the *Stone:* Of this Kinde is the *Dwarfe-Pine*; which is Proper for the *Iaundice:* Of this Kinde is *Harts-Horne*; which is Proper for *Agues*, and *Infections:* Of this Kinde is *Piony*; which is Proper for *Stoppings* in the *Head:* Of this Kinde is *Fumitory*; which is Proper for the *Spleene:* And a Number of others. Generally, divers *Creatures* bred of *Putrefaction*, though they be somewhat loathsome to take, are of this kinde; As *Earth-wormes*, *Timber-Sowes*, *Snailes*, &c. And I conceive, that the *Trochisches* of *Vipers*, (which are so much magnified,) and the *Flesh* of *Snakes* some wayes condited, and corrected, (which of late are growne into some Credite,) are of the same Nature. So the *Parts* of *Beasts Putrified*, (as *Castoreum*, and *Muske*, which have extreme *Subtill Parts*,) are to be placed amongst them. We see also that *Putrefactions* of *Plants*, (as *Agaricke*, and *Iewes-Eare*,) are of greatest Vertue. The *Cause* is, for that *Putrefaction* is the Subtilest of all *Motions*, in the *Parts* of *Bodies:* And since we cannot take down the *Lives* of *Living Creatures*, (which some of the *Paracelsians* say (if they could bee taken downe,) would make us *Immortall*;) the Next is for *Subtilty* of *Operation*, to take *Bodies Putrefied*; Such as may be safely taken.

Experiments in Consort touching *Venus*

693

IT hath beene observed by the *Ancients*, that *Much Vse* of *Venus* doth *Dimme* the *Sight*; And yet *Eunuchs*, which are unable to generate are (nevertheless) also *Dimme Sighted*. The *Cause* of *Dimnesse* of *Sight*, in the Former, is the *Expence* of *Spirits:* In the Latter, the *Over-moisture* of the *Braine:* For the *Over-moisture* of the *Braine* doth thicken the *Spirits Visuall*, and obstructeth their Passages; As we see by the Decay, in the *Sight*, in *Age*; Where also the *Diminution* of the *Spirits* concurreth as another *Cause:* we see also that *Blindnesse* commeth by *Rheumes*, and *Cataracts*. Now in *Eunuchs*, there are all the Notes of *Moisture*; As the Swelling of their Thighes, the Loosenesse of their Belly, the Smoothnesse of their Skinne, &c.

694

The *Pleasure* in the *Act* of *Venus*, is the greatest of the *Pleasures* of the *Senses*; The Matching of it with *Itch* is unproper; though that also be Pleasing to the touch. But the *Causes* are Profound. First, all the *Organs* of the *Senses* qualifie the *Motions* of the *Spirits*; And make so many Severall *Species* of *Motions*, and *Pleasures* or *Displeasures* thereupon, as there be *Diversities* of *Organs*. The *Instruments* of *sight*, *Hearing*, *Taste*, and *Smell*, are of severall frame; And so are the Parts for Generation. Therefore *Scaliger* doth well, to make the *Pleasure* of *Generation* a *sixth Sense*; And if there were any other differing *Organs*, and Qualified *Perforations*, for the *Spirits* to passe; there would be more than the *Five Senses:* Neither doe wee well know, whether some *Beasts*, and *Birds*, have not *Senses* that we know not; And the very *Sent* of *Dogs* is almost a *Sense* by it selfe. Secondly, the *Pleasures* of the *Touch*, are greater and

deeper

deeper, than those of the other *Senses*; As we see in *Warming* upon *Cold*; Or *Refrigeration* upon *Heat*: For as the *Paines* of the *Touch*, are greater than the *Offences* of other *Senses*; So likewise are the *Pleasures*. It is true, that the *Affecting* of the *Spirits immediately*, and (as it were) without an *Organ*, is of the greatest *Pleasure*; Which is but in two things: *Sweet Smells*; And *Wine*, and the like *Sweet Vapours*. For *Smells*, we see their great and sudden Effect in fetching *Men* againe, when they swoune: For *Drinke*, it is certaine, that the *Pleasure* of *Drunkennesse*, is next the *Pleasure* of *Venus*: And *Great Ioyes* (likewise) make the *Spirits* move, and touch themselves: And the *Pleasure* of *Venus* is somewhat of the same Kinde.

995 It hath beene alwayes observed, that *Men* are more inclined to *Venus* in the *winter*, and *Women* in the *Summer*. The *Cause* is, for that the *Spirits*, in a *Body* more Hot and Dry, as the *Spirits* of *Men* are,) by the *Summer* are more exhaled, and dissipated; And in the *Winter* more condensed, and kept entire: But in *Bodies* that are Cold and Moist, (as *Womens* are,) the *Summer* doth Cherish the *Spirits*, and calleth them forth; the *Winter* doth dull them. Furthermore, the *Abstinence*, or *Intermission* of the *Vse* of *Venus*, in *Moist* and *well habituate Bodies*, breedeth a *Number* of *Diseases*; And especially dangerous *Impostumations*. The Reason is evident; For that it is a Principall *Evacuation*, especially of the *Spirits*: For of the *Spirits*, there is scarce any *Evacuation*, but in *Venus*, and *Exercise*. And therefore the *Omission* of either of them, breedeth all *Diseases* of *Repletion*.

Experiments in Consort touching the *Insecta*.

The *Nature* of *Vivification* is very worthy the Enquiry: And as the *Nature* of *Things*, is commonly better perceived, in Small, than in Great; and in unperfect, than in perfect; and in Parts, than in whole: So the *Nature* of *Vivification* is best enquired in *Creatures* bred of *Putrefaction*. The *Contemplation* whereof hath many *Excellent Fruits*. First, in *Disclosing* the *Originall* of *Vivification*. Secondly, in *Disclosing* the *Original* of *Figuration*. Thirdly, in *Disclosing* many *Things* in the *Nature* of *Perfect Creatures*, which in them lye more hidden. And Fourthly, in *Traducing*, by way of *Operation*, some *Observations* in the *Insecta*, to worke *Effects* upon *Perfect Creatures*. Note that the word *Insecta* agreeth not with the Matter, but we ever use it for Brevities sake, intending by it *Creatures bred of Putrefaction*.

696 The *Insecta* are found to breed out of severall *Matters*: Some breed of *Mud*, or *Dung*; As the *Earth-wormes*, *Eeles*, *Snakes*, &c. For they are both *Putrefactions*: For *Water* in *Mud* doth Putrifie, as not able to Preserve it selfe: And for *Dung*, all *Excrements* are the *Refuse* and *Putrefactions*

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ons of *Nouriſhment*. Some breed in *Wood*, both Growing, and Cut downe. *Quære* in what *Woods* moſt, & at what Seaſons? We ſee that the *Wormes* with many Feet, which round themſelves into Balls, are bred chiefly under *Logs* of *Timber*, but not in the *Timber*; And they are ſaid to be found alſo, (many times,) in *Gardens*, where no *Logs* are. But it ſeemeth their *Generation* requireth a *Coverture*, both from *Sunne*, and *Raine*, or *Dew*; As the *Timber* is; And therfore they are not *Venomous*, but (contrariwiſe) are held by the *Phyſitians* to clarifie the *Bloud*. It is obſerved alſo that *Cimices* are found in the *Holes* of *Bed-Sides*. Some breed in the *Haire* of *Living Creatures*; As *Lice*, and *Tikes*; which are bred by the *Sweat* cloſe kept, and ſomewhat arefied by the *Haire*. The *Excrements* of *Living Creatures*, do not only breed *Inſecta*, when they are Excerned, but alſo while they are in the *Body*; As in *Wormes*, whereto Children are moſt ſubject, and are chiefly in the Guts. And it hath beene lately obſerved by *Phyſitians*, that in many *Peſtilent Diſeaſes*, there are *Wormes* found in the upper Parts of the Body, where *Excrements* are not, but onely *Humours Putrified*. *Fleas* breed Principally of *Straw* or *Mats*, where there hath beene a little *Moiſture*; Or the *Chamber* and *Bed-ſtraw* kept cloſe, and not Aired. It is received that they are killed by Strewing *Worme-wood* in the *Rooms*. And it is truly obſerved, that *Bitter Things* are apt, rather to kill, than engender *Putrefaction*; And they be *Things*, that are *Fat*, or *Sweet*, that are apteſt to *Putrifie*. There is a *Worme*, that breedeth in *Meale*, of the ſhape of a large white *Maggot*. which is given as a great Daintie to *Nightingales*. The *Moath* breedeth upon *Cloth*, and other *Lanifices*; Eſpecially if they be laid up dankiſh, and wet. It delighteth to be about the *Flame* of a *Candle*. There is a *Worme* called a *Wevill*, bred under *Ground*, and that feedeth upon *Roots*; As *Parſnips*, *Carrets*, &c. Some breed in *Waters*, eſpecially ſhaded, but they muſt be *Standing-waters*; As the *Water-Spider*, that hath ſix Legs. The *Fly* called the *Gad-fly*, breedeth of ſomewhat that Swimmeth upon the Top of the *Water*, and is moſt about *Ponds*. There is a *Worme* that breedeth of the *Dregs* of *Wine Decayed*; which afterwards, (as is obſerved by ſome of the *Ancients*,) turneth into a *Gnat*. It hath been obſerved by the *Ancients* that there is a *Worme* that breedeth in old *Snow*, and is of Colour Reddiſh, and dull of Motion, and dieth ſoone after it commeth out of *Snow*. Which ſhould ſhew, that *Snow* hath in it a ſecret *Warmth*; For elſe it could hardly Vivifie. And the Reaſon of the Dying of the *Worme*, may be the ſudden Exhaling of that little *Spirit*, as ſoone as it commeth out of the *Cold*, which had ſhut it in. For as *Butterflies* quicken with *Heat*, which were benummed with *Cold*; So *Spirits* may exhale with *Heat*, which were Preſerved in *Cold*. It is affirmed both by *Ancient* and *Moderne Obſervation*, that in *Furnaces* of *Copper*, and *Braſſe*, where *Chalcites*, (which is *Vitriol*,) is often caſt in, to mend the working, there riſeth ſuddenly a *Fly*, which ſometimes moveth, as if it tooke hold on the walls of the *Furnace*; Sometimes is ſeene moving in the *Fire* below; And dieth preſently, as ſoone as it is out of the *Furnace*. Which is a Noble *Inſtance*, and worthy to be weighed; for it ſheweth that as well

Violent Heat of *Fire*, as the *Gentle Heat* of *Living Creatures*, will Vivifie, if it have Matter Proportionable. Now the great *Axiome* of *Vivification* is, that there must be *Heat* to dilate the *Spirit* of the *Body*; An *Active Spirit* to be dilated; *Matter Viscous* or *Tenacious*, to hold in the *Spirit*; And that *Matter* to be *put forth*, and *Figured*. Now a *Spirit* dilated by so ardent a *Fire*, as that of the *Furnace*, as soone as ever it cooleth never so little, congealeth presently. And (no doubt) this *Action* is furthered by the *Chalcites*, which hath a *Spirit*, that will Put forth and germinate, as we see in *Chymicall* Trialls. Briefly, most *Things Putrified* bring forth *Insecta* of severall Names; But wee will not take upon us now, to Enumerate them all.

697 The *Insecta* have beene noted by the *Ancients*, to feed little: But this hath not beene diligently observed; For *Grashoppers* eat up the *Greene* of whole *Countries*; And *Silke-wormes* devoure *Leaves* swiftly; And *Ants* make great Provision. It is true, that *Creatures*, that Sleepe and rest much, Eat little; As *Dormise*, and *Bats*, &c. They are all without *Bloud*: Which may be, for that the *Iuyce* of their *Bodies*, is almost all one; Not *Bloud*, and *Flesh*, and *Skin*, and *Bone*, as in *Perfect Creatures*; The *Integrall Parts* have Extreme Varietie, but the *Similar Parts* little. It is true, that they have, (some of them,) a *Diaphragme*, and an *Intestine*; And they have all *Skins*; Which in most of the *Insecta* are cast often. They are not (generally) of *long Life*: Yet *Bees* have beene knowne to live seven yeares: And *Snakes* are thought, the rather for the *Casting* of their *Spoile*, to live till they be Old: And *Eeles*, which many times breed of *Putrefaction*, will live and grow verie long: And those that Enterchange from *Wormes* to *Flyes* in the *Summer*, and from *Flyes* to *Wormes* in the *Winter*, have been kept in Boxes foure yeares at the least. Yet there are certaine *Flies*, that are called *Ephemera*, that live but a day. The *Cause* is, the Exilitie of the *Spirit*; Or perhaps the Absence of the *Sunne*; For that if they were brought in, or kept close, they might live longer. Many of the *Insecta*, (as *Butterflies*, and other *Flies*,) revive easily, when they seeme dead, being brought to the *Sunne*, or *Fire*. The *Cause* whereof is, the *Diffusion* of the *Vitall Spirit*, and the *Easie Dilating* of it by a little *Heat*. They stirre a good while, after their *Heads* are off, or that they be cut in Peeces; Which is caused also, for that their *Vitall Spirits* are more diffused thorow-out all their *Parts*, and lesse confined to *Organs*, than in *Perfect Creatures*.

698 The *Insecta* have *Voluntarie Motion*, and therefore *Imagination*; And whereas some of the *Ancients* have said, that their *Motion* is Indeterminate, and their *Imagination* Indefinite, it is negligently observed; For *Ants* goe right forwards to their Hills; And *Bees* doe (admirably) know the way, from a Flowrie Heath, two or three Miles off, to their Hives. It may be, *Gnats*, and *Flyes*, have their *Imagination* more mutable, and giddy, as *Small Birds* likewise have. It is said by some of the *Ancients*, that they have onely the *Sense* of *Feeling*; which is manifestly untrue: For if they goe forth-right to a Place, they must needs have

Sight:

Sight: Besides they delight more in one *Flower*, or *Herb*, than in another, and therefore have *Taste*: And *Bees* are called with *Sound* upon *Brasse*, and therefore they have *Hearing*: Which sheweth likewise that though their *Spirit* be diffused, yet there is a *Seat* of their *Senses* in their *Head*.

Other Observations *concerning the* Insecta, *together with the* Enumeration *of them, wee referre to that place, where we meane to handle the* Title *of* Animal's *in generall.*

Experiment Solitary, touching *Leaping.* 699

A *Man Leapeth* better with *Weights*, in his *Hands*, than without. The *Cause* is, for that the *Weight*, (if it be proportionable,) strengtheneth the *Sinnewes*, by *Contracting* them. For otherwise, where no *Contraction* is needfull, *Weight* hindreth. As wee see in *Horse-Races*, *Men* are curious to fore-see, that there be not the least *Weight*, upon the one *Horse*, more than upon the other. In *Leaping* with *Weights*, the *Armes* are first cast backwards, and then forwards, with so much the greater Force: For the *Hands* goe backward before they take their Raise. *Quære*, if the contrarie *Motion* of the *Spirits*, immediately before the *Motion* we intend, doth not cause the *Spirits*, as it were, to breake forth with more Force: As *Breath* also drawne, and kept in, commeth forth more forcibly: And in *Casting* of any *Thing*, the *Armes*, to make a greater Swing, are first cast backward.

Experiment Solitary, touching the *Pleasures*, and *Displeasures* of the *Senses*, especially of *Hearing.* 700

OF *Musicall Tones*, and *Vnequall Sounds*, wee have spoken before; But touching the *Pleasure*, and *Displeasure* of the *Senses*, not so fully. *Harsh Sounds*, as of a *Saw*, when it is sharpened; *Grinding* of one *Stone* against another; *Squeaking*, or *Skriching Noise*; make a *Shivering* or *Horrour* in the *Body*, and set the *Teeth* on edge. The *Cause* is, for that the *Objects* of the *Eare*, doe affect the *Spirits* (immediately) most with *Pleasure* and Offence. We see, there is no *Colour* that affecteth the *Eye* much with *Displeasure*: There be *Sights*, that are *Horrible*, because they excite the *Memorie* of *Things* that are *Odious*, or *Fearefull*; But the same *Things Painted* doe little affect. As for *Smells*, *Tastes*, and *Touches*, they be *Things* that doe affect, by a *Participation*, or *Impulsion* of the *Body*, of the *Object*. So it is *Sound* alone, that doth immediately, and incorporeally, affect most: This is most manifest in *Musicke*; and *Concords* and *Discords* in *Musicke*: For all *Sounds*, whether they be sharp, or Flat, if they be Sweet, have a Roundnesse and *Equalitie*; And if they be Harsh, are *Vnequall*: For a *Discord* it selfe is but a *Harshnesse* of *Divers Sounds Meeting*. It is true, that *Inequalitie*, not Stayed upon, but Passing, is rather an Encrease of *Sweetnesse*; As in the *Purling* of a *Wreathed String*; And in the *Raucitie* of a *Trumpet*; And in the *Nightinghale-Pipe* of a *Regall*; And in a *Discord* straight falling upon a *Concord*: But if you stay upon it, it is *Offensive*; And therefore, there be these three *Degrees* of *Pleasing*,

and *Displeasing* in *Sounds*; *Sweet Sounds*; *Discords*; and *Harsh Sounds*, which we call by divers Names, as *Skriching*, or *Grating*, such as we now speake of. As for the *Setting* of the *Teeth* on *Edge*, we see plainly, what an Intercourse there is, betweene the *Teeth*, and and the *Organ* of the *Hearing*, by the Taking of the End of a Bow, betweene the *Teeth*, and *Striking* upon the *String*.

NATU-

NATVRALL HISTORIE.

VIII. Century.

THere be *Mineralls*, and *Fossiles*, in great Varietie; But of *Veines* of *Earth Medicinall*, but few; The Chiefe are, *Terra Lemnia*, *Terra Sigillata communis*, and *Bolus Armenus*: Whereof *Terra Lemnia* is the Chiefe. The *Vertues* of them are, for *Curing* of *Wounds*, *Stanching* of *Bloud*, *Stopping* of *Fluxes* and *Rheumes*, and *Arresting* the *Spreading* of *Poison*, *Infection*, and *Putrefaction*: And they have, of all other *Simples*, the Perfectest and Purest *Qualitie* of *Drying*, with little or no Mixture of any other *Qualitie*. Yet it is true, that the *Bole-Arminick* is the most *Cold* of them; And that *Terra Lemnia* is the most *Hot*; For which Cause, the *Island Lemnos*, where it is digged, was in the Old *Fabulous Ages* consecrated to *Vulcan*.

Experiment Solitary touching *Veines* of *Medicinall Earth*. 701

ABout the *Bottome* of the *Straights* are gathered great Quantities of *Sponges*, which are gathered from the sides of *Rocks*, being as it were a large, but tough, *Mosse*. It is the more to be noted, because that there be but few *Substances*, *Plant-like*, that grow deepe within the *Sea*; For they are gathered sometimes fifteen Fathome deepe; And when they are laid

Experiment Solitary touching the *Growth* of *Sponges*. 702

on Shoare, they seeme to be of great Bulke; But crushed together, will be transported in a verie small Roome.

Experiment Solitary touching *Sea-Fish* put in *Fresh Waters*.

703

IT seemeth, that *Fish*, that are used to the *Salt-Water*, doe nevertheless delight more in *Fresh*. We see, that *Salmons*, and *Smelts*, love to get into *Rivers*, though it be against the *Streame*. At the *Haven* of *Constantinople*, you shall have great *Quantities* of *Fish* that come from the *Euxine-Sea*; that when they come into the *Fresh Water*, doe inebriate and turne up their *Bellies*; So as you may take them with your Hand. I doubt, there hath not beene sufficient *Experiment* made of Putting *Sea-Fish* into *Fresh Water*, *Ponds*, and *Pooles*. It is a Thing of great Use, and Pleasure: For so you may have them new at some good distance from the *Sea*: And besides, it may be, the *Fish* will eat the pleasanter, and may fall to breed: And it is said that *Colchester Oysters*, which are put into Pits, where the *Sea* g eth and commeth, (but yet so, that there is a *Fresh Water* comming also to them, when the *Sea* voideth,) become by that meanes Fatter, and more Growne.

Experiment Solitary, touching *A traction* by *Similitude* of *Substance*.

704

THe *Turkish-Bow* giveth a verie Forcible *Shoot*; Insomuch as it hath been knowne, that the *Arrow* hath pierced a *Steele Target*, or a Peece of *Brasse* of two Inches thicke: But that which is more strange, the *Arrow*, if it be Headed with *Wood*, hath beene knowne to pierce thorow a Peece of *Wood*, of eight Inches thicke. And it is certaine, that we had in use at one time, for *Sea-Fight*, short *Arrowes*, which they called *Sprights*, without any other Heads, save *Wood* sharpned; which were discharged out of *Muskets*, and would pierce thorow the Sides of *Ships*, where a *Bullet* would not pierce But this dependeth upon one of the greatest *Secrets* in all *Nature*; Which is, that *Similitude* of *Substance* will cause *Attraction*, where the Body is wholly freed from the *Motion* of *Gravitie*: For if that were taken away, *Lead* would draw *Lead*, and *Gold* would draw *Gold*, and *Iron* would draw *Iron*, without the help of the *Load-Stone*. But this same *Motion* of *Weight* or *Gravitie*, (which is a meere *Motion* of the *Matter*, and hath no Affinitie with the *Forme*, or *Kinde*,) doth kill the other *Motion*, except it selfe be killed by a violent *Motion*; As in these *Instances* of *Arrowes*; For then the *Motion* of *Attraction* by *Similitude* of *Substance*, beginneth to shew it selfe. But we shall handle this Point of *Nature* fully in due Place.

Experiment Solitary touching certaine *Drinkes* in *Turkey*.

705

THey have in *Turkey*, and the *East*, certaine *Confections*, which they call *Servetts*, which are like to *Candied Conserves*; And are made of *Sugar* and *Limons*, or *Sugar* and *Citrons*, or *Sugar* and *Violets*, and some other Flowers; And some Mixture of *Amber* for the more delicate Persons; And those they dissolve in *Water*, and thereof make their *Drinke*, because they are forbidden *Wine* by their *Law*. But I doe much marvell, that no *Englishman*, or *Dutchman*, or *German*, doth set up *Brewing* in *Constantinople*; Considering they have such Quantitie of *Barley*. For as for the

the generall Sort of *Men*, Frugalitie may be the *Cause* of *Drinking Water*; For that it is no small Saving, to pay nothing for ones *Drinke*: But the better Sort mought well beat the Cost. And yet I wonder the lesse at it, because I see *France*, *Italy*, or *Spaine*, have not taken into use, *Beere*, or *Ale*; Which (perhaps) if they did, would better both their Healths, and their Complexions. It is likely it would be Matter of great Gaine to any, that should begin it in *Turkey*.

Experiments in Consort touching *Sweat*.

706 IN *Bathing* in *Hot Water*, *Sweat* (nevertheless) commeth not in the *Parts* under the *Water*. The *Cause* is; First, for that *Sweat* is a Kinde of *Colliquation*. And that Kinde of *Colliquation* is not made, either by an *Over-Drie Heat*, or an *Over-Moist Heat*. For *Over-Moisture* doth somewhat extinguish the *Heat*; As wee see that even *Hot Water* quencheth *Fire*: And *Over-Drie Heat* shutteth the *Pores*: And therefore *Men* will sooner *Sweat* covered before the *Sunne*, or *Fire*, than if they stood Naked; And *Earthen Bottles*, filled with *Hot water*, doe provoke, in Bed, a *Sweat* more daintily, than *Bricke-bats Hot*. Secondly, *Hot Water* doth cause *Evaporation* from the *Skin*; So as it spendeth the Matter, in those Parts under the *Water*, before it issueth in *Sweat*. Againe, *Sweat* commeth more plentifully, if the *Heat* be increased by *Degrees*, than if it be greatest at first, or equall. The *Cause* is, for that the *Pores* are better opened by a *Gentle Heat*, than by a more *Violent*; And by their opening the *Sweat* issueth more abundantly. And therefore *Physitians* may doe well, when they provoke *Sweat* in Bed, by *Bottles*, with a *Decoction* of *Sudorificke Herbs* in *Hot Water*, to make two *Degrees* of *Heat* in the *Bottles*; And to lay in the Bed, the *lesse Heated* first, and after halfe an Houre the *more Heated*.

707 *Sweat* is *Salt* in Taste; The *Cause* is, for that, that *Part* of the *Nourishment*, which is *Fresh* and *Sweet*, turneth into *Bloud*, and *Flesh*; And the *Sweat* is only that *Part* which is *Separate*, and *Excerned*. *Bloud* also Raw hath some *Saltnesse*, more than Flesh; because the *Assimilation* into *Flesh*, is not without a little and subtile *Excretion* from the *Bloud*.

708 *Sweat* commeth forth more out of the *Vpper Parts* of the *Body*, than the *Lower*; The *Reason* is, because those *Parts* are more repleni shed with *Spirits*; And the *Spirits* are they that put forth *Sweat*: Besides, they are lesse *Fleshy*, and *Sweat* issueth (chiefly) out of the *Parts* that are lesse *Fleshy*, and more *Dry*; As the *Forehead*, and *Breast*.

709 Men *Sweat* more in *Sleepe*, than *Waking*; And yet *Sleepe* doth rather stay other *Fluxions*, than cause them; As *Rheumes*, *Loosenesse* of the *Body*, &c. The *Cause* is, for that in *Sleepe*, the *Heat* and *Spirits* doe naturally move inwards, and there rest. But when they are collected once within, the *Heat* becommeth more Violent, and Irritate; And thereby expelleth *Sweat*.

710 *Cold Sweats* are (many times) *Mortall*, and neere *Death*; And alwayes *Ill*, and *Suspected*; As in *Great Feares*, *Hypochondriacall Passions*, &c. The *Cause* is, for that *Cold Sweats* come by a *Relaxation* or *Forsaking* of the *Spirits*,

Spirits, whereby the *Moisture* of the Body, which *Heat* did keepe firme in the *Parts*, severeth, and issueth out.

711 In those *Diseases*, which cannot be discharged by *Sweat*, *Sweat* is ill, and rather to be stayed; As in *Diseases* of the *Lungs*, and *Fluxes* of the *Belly*; But in those *Diseases*, which are expelled by *Sweat*, it easeth and lightneth; As in *Agues*, *Pestilences*, &c. The *Cause* is, for that *Sweat* in the Latter Sort is partly *Criticall*, and sendeth forth the *Matter* that offendeth; But in the Former, it either proceedeth from the *Labour* of the *Spirits*, which sheweth them Oppressed; Or from *Motion* of *Consent*, when *Nature* not able to expell the *Disease*, where it is seated, moveth to an *Expulsion* indifferent over all the *Body*.

Experiment Solitary, touching the *Glo-worme*.

712 THe *Nature* of the *Glo-worme* is hitherto not well observed. Thus much wee see; That they breed chiefly in the *Hottest Moneths* of *Summer*; And that they breed not in *Champaigne*, but in *Bushes*, and *Hedges*. Whereby it may be conceived, that the *Spirit* of them is verie fine, and not to be refined, but by *Summer Heats*: And againe, that by reason of the Fineness, it doth easily exhale. In *Italy*, and the *Hotter Countries*, there is a *Fly* they call *Lucciole*, that shineth as the *Glo-worme* doth; And it may be is the *Flying Glo-worme*. But that *Fly* is chiefly upon *Fens*, and *Marrishes*. But yet the two former *Observations* hold; For they are not seene, but in the *Heat* of *Summer*; And *Sedge*, or other *Greenne* of the *Fens*, give as good Shade, as *Bushes*. It may be the *Glo-wormes* of the *Cold Countries* ripen not so farre as to be *Winged*.

Experiments in Consort touching the *Impressions*, which the *Passions* of the *Minde* make upon the *Body*.

713 THe *Passions* of the *Minde*, worke upon the *Body* the *Impressions* following. *Feare* causeth *Paleneſſe*; *Trembling*; The *Standing* of the *Haire upright*; *Starting*; and *Skritching*. The *Paleneſſe* is caused, for that the *Bloud* runneth inward, to succour the *Heart*. The *Trembling* is caused, for that through the *Flight* of the *Spirits* inward, the *Outward Parts* are destituted, and not sustained. *Standing Vpright* of the *Haire* is caused, for that by the *Shutting* of the *Pores* of the *Skin*, the *Haire* that lyeth asloape, must needs Rise. *Starting* is both an *Apprehension* of the *Thing feared*; (And, in that kinde, it is a *Motion* of *Shrincking*;) And likewise an *Inquisition*, in the beginning, what the Matter should be; (And in that kinde it is a *Motion* of *Erection*;) And therefore, when a *Man* would listen suddenly to any Thing, he *Starteth*; For the *Starting* is an *Erection* of the *Spirits* to attend. *Skritching* is an *Appetite* of *Expelling* that which suddenly striketh the *Spirits*: For it must be noted, that many *Motions*, though they be unprofitable to expell that which hurteth, yet they are *Offers* of *Nature*, and cause *Motions* by *Consent*; As in *Groaning*, or *Crying* upon *Paine*.

714 *Griefe* and *Paine* cause *Sighing*; *Sobbing*; *Groaning*; *Screaming*; and *Roaring*; *Teares*; *Distorting* of the *Face*; *Grinding* of the *Teeth*; *Sweating*. *Sighing* is caused by the *Drawing* in of a greater *Quantity* of *Breath* to refresh the *Heart* that laboureth: like a great *Draught* when one is thirsty.

Sobbing

Sobbing is the same Thing stronger. *Groaning*, and *Screaming*, and *Roaring*, are caused by an *Appetite* of *Expulsion*, as hath beene said: For when the *Spirits* cannot expell the Thing that hurteth, in their Strife to do it, by *Motion* of *Consent*, they expell the *Voice*. And this is, when the *Spirits* yeeld, and give over to resist; For if one doe constantly resist *Paine*, he will not groane. *Teares* are caused by a *Contraction* of the *Spirits* of the *Braine*; Which *Contraction* by consequence astringeth the *Moisture* of the *Braine*, and thereby sendeth *Teares* into the *Eyes*. And this *Contraction*, or *Compression* causeth also *Wringing* of the *Hands*; For *Wringing* is a *Gesture* of *Expression* of *Moisture*. The *Distorting* of the *Face* is caused by a *Contention*, first to beare and resist, and then to expell; Which maketh the Parts knit first, and afterwards open. *Grinding* of the *Teeth* is caused (likewise) by a *Gathering* and *Serring* of the *Spirits* together to resist; Which maketh the *Teeth* also to set hard one against another. *Sweating* is also a *Compound Motion* by the *Labour* of the *Spirits*, first to resist, and then to expell.

715 *Joy* causeth a *Chearefulnesse*, and *Vigour* in the *Eyes*; *Singing*; *Leaping*; *Dancing*; And sometimes *Teares*. All these are the *Effects* of the *Dilatation*, and *Comming* forth of the *Spirits* into the *Outward Parts*; Which maketh them more *Lively*, and *Stirring*. We know it hath beene seene, that *Excessive Sudden Joy* hath causeth *Present Death*, while the *Spirits* did spread so much, as they could not retire againe. As for *Teares*, they are the Effects of *Compression* of the *Moisture* of the *Braine*, upon *Dilatation* of the *Spirits*. For *Compression* of the *Spirits* worketh an *Expression* of the *Moisture* of the *Braine*, by *Consent*, as hath beene said in *Griefe*. But then in *Joy*, it worketh it diversly; *viz.* by *Propulsion* of the *Moisture*, when the *Spirits* dilate, and occupie more Roome.

716 *Anger* causeth *Paleneſſe* in some, and the *Going* and *Comming of the Colour* in Others: Also *Trembling* in some; *Swelling*; *Foaming* at the *Mouth*; *Stamping*; *Bending* of the *Fist*. *Paleneſſe*, and *Going* and *Comming* of the *Colour*, are caused by the *Burning* of the *Spirits* about the *Heart*; Which to refresh themselves call in more *Spirits* from the *Outward Parts*. And if the *Paleneſſe* be alone, without *Sending forth* the *Colour* againe, it is commonly joyned with some *Feare*; But in many there is no *Paleneſſe* at all, but contrariwise *Redneſſe* about the *Cheekes*, and *Gills*; Which is by the *Sending forth* of the *Spirits* in an *Appetite* to *Revenge*. *Trembling* in *Anger* is likewise by a *Calling* in of the *Spirits*; And is commonly, when *Anger* is joyned with *Feare*. *Swelling* is caused, both by a *Dilatation* of the *Spirits* by *Over-Heating*, and by a *Liquefaction* or *Boyling* of the *Humours* thereupon. *Foaming* at the *Mouth* is from the same *Cause*, being an *Ebullition*. *Stamping*, and *Bending* of the *Fist*, are caused by an *Imagination* of the *Act* of *Revenge*.

717 *Light Displeasure* or *Dislike*, causeth *Shaking* of the *Head*; *Frowning*, and *Knitting* of the *Browes*. These *Effects* arise from the same *Causes* that *Trembling*, and *Horrour* doe; Namely, from the *Retiring* of the *Spirits*, but in a lesse degree. For the *Shaking* of the *Head* is but a Slow and Definite

Definite *Trembling*; And is a *Gesture* of *Slight Refusall*: And we see also, that a *Dislike* causeth (often) that *Gesture* of the *Hand*, which wee use, when we refuse a Thing, or warne it away. The *Frowning*, and *Knitting* of the *Browes*, is a *Gathering*, or *Serring* of the *Spirits*, to resist in some Measure. And we see also, this *Knitting* of the *Browes* will follow upon earnest *Studying*, or *Cogitation* of any Thing, though it be without *Dislike*.

718 *Shame* causeth *Blushing*; And *Casting downe* of the *Eyes*. *Blushing* is the *Resort* of *Bloud* to the *Face*; Which in the *Passion* of *Shame* is the *Part* that laboureth most. And although the *Blushing* will be seene in the whole *Breast*, if it be Naked, yet that is but in Passage to the *Face*. As for the *Casting downe* of the *Eyes*, it proceedeth of the *Reverence* a Man beareth to other Men; Whereby, when he is ashamed, hee cannot endure to looke firmely upon Others: And we see that *Blushing*, and the *Casting downe* of the *Eyes* both, are more when wee come before Many; *Ore Pompeii quid mollius? Nunquàm non coram pluribus erubuit:* And likewise when we come before *Great*, or *Reverend Persons*.

719 *Pitie* causeth sometimes *Teares*; And a *Flexion* or *Cast* of the *Eye aside*. *Teares* come from the same *Cause* that they doe in *Griefe*: for *Pitie* is but *Griefe* in Anothers Behalfe. The *Cast* of the *Eye* is a *Gesture* of *Aversion*, or *Lothnesse* to behold the *Object* of *Pitie*.

720 *Wonder* causeth *Astonishment*, or an *Immoveable Posture* of the *Bodie*; *Casting* up of the *Eyes* to *Heaven*; And *Lifting* up of the *Hands*. For *Astonishment*, it is caused by the *Fixing* of the *Minde* upon one *Object* of *Cogitation*, whereby it doth not spatiate and transcurre, as it useth: For in *Wonder* the *Spirits* flie not, as in *Feare*; But onely settle, and are made lesse apt to move. As for the *Casting* up of the *Eyes*, and *Lifting* up of the *Hands*, it is a *Kinde* of *Appeale* to the *Deitie*; Which is the *Authour*, by *Power*, and *Providence*, of *Strange Wonders*.

721 *Laughing* causeth a *Dilatation* of the *Mouth*, and *Lips*; A *Continued Expulsion* of the *Breath*, with the loud *Noise*, which maketh the *Interjection* of *Laughing*; *Shaking* of the *Breast*, and *Sides*; *Running* of the *Eyes* with *Water*, if it be Violent, and Continued. Wherein first it is to be understood, that *Laughing* is scarce (properly) a *Passion*, but hath his *Source* from the *Intellect*; For in *Laughing* there ever precedeth a *Conceit* of somewhat *Ridiculous*. And therefore it is Proper to *Man*. Secondly, that the *Cause* of *Laughing* is but a *Light Touch* of the *Spirits*, and not so deepe an *Impression* as in other *Passions*. And therefore, (that which hath no *Affinitie* with the *Passions* of the *Minde*,) it is moved, and that in great vehemencie, only by *Tickling* some *Parts* of the *Body*: And we see that *Men* even in a *Grieved State* of *Minde*, yet cannot sometimes forbeare *Laughing*. Thirdly, it is ever joyned with some *Degree* of *Delight*: And therefore *Exhilaration* hath some *Affinitie* with *Joy*, though it be a much *Lighter Motion*: *Res severa est verum Gaudium*. Fourthly, that the *Object* of it is *Deformitie*, *Absurditie*, *Shrewd Turnes*, and the like. Now to speake of the *Causes* of the *Effects* before mentioned, whereunto these

Generall

Generall Notes gives some *Light*. For the *Dilatation* of the *Mouth* and *Lips*, *Continued Expulsion* of the *Breath* and *Voice*, and *Shaking* of the *Breast* and *Sides*, they proceed (all) from the *Dilatation* of the *Spirits*; Especially being Sudden. So likewise, the *Running* of the *Eyes* with *Water*, (as hath beene formerly touched, where we spake of the *Teares* of *Joy* and *Griefe*,) is an Effect of *Dilatation* of the *Spirits*. And for *Suddennesse*, it is a great *Part* of the *Matter*: For we see, that any *Shrew'd Turne* that lighteth upon Another; Or any *Deformitie*, &c. moveth *Laughter* in the Instant; Which after a little time it doth not. So we cannot *Laugh* at any Thing after it is *Stale*, but whilest it is *New*: And even in *Tickling*, if you *Tickle* the *Sides*, and give warning; Or give a *Hard* or *Continued Touch*, it doth not move *Laughter* so much.

Lust causeth a *Flagrancie* in the *Eyes*; and *Priapisme*. The *Cause* of both these is, for that in *Lust*, the *Sight*, and the *Touch*, are the Things desired: And therefore the *Spirits* resort to those parts, which are most affected. And note well in generall, (For that great Use may be made of the *Observation*,) that (evermore) the *Spirits*, in all *Passions*, resort most to the *Parts*, that labour most, or are most affected. As in the last, which hath been mentioned, they resort to the *Eyes*, and *Venereous Parts*: In *Feare*, and *Anger*, to the *Heart*: In *Shame* to the *Face*: And in *Light Dislikes* to the *Head*. 722

Experiments in Consort touching *Drunkennesse*.

IT hath beene observed by the *Ancients*, and is yet beleeved, that the *Sperme* of *Drunken Men* is *Unfruitfull*. The *Cause* is, for that it is *Overmoistened*, and wanteth *Spissitude*. And wee have a merrie Saying, that they that goe *Drunke* to *Bed*, get *Daughters*. 723

Drunken Men are taken with a plaine *Defect*, or *Destitution* in *Voluntarie Motion*. They Reele; They tremble; They cannot stand, nor speak strongly. The *Cause* is, for that the *Spirits* of the *Wine*, oppresse the *Spirits Animall*, and occupate Part of the Place, where they are; And so make them Weake to move. And therefore *Drunken Men* are apt to fall asleepe: And *Opiates*, and *Stupefactives*, (as *Poppy*, *Henbane*, *Hemlocke*, &c.) induce a kinde of *Drunkennesse*, by the *Grossenesse* of their *Vapour*; As *Wine* doth by the *Quantitie* of the *Vapour*. Besides, they rob the *Spirits Animall* of their *Matter*, whereby they are nourished: For the *Spirits* of the *Wine* prey upon it, as well as they: And so they make the *Spirits* lesse Supple, and Apt to move. 724

Drunken Men imagine everie *Thing turneth round*; They imagine also that *Things come upon them*; They *See* not well *Things a farre off*; Those Things that they *See neare hand*, they *See out of their Place*: And (sometimes) they *see Things double*. The *Cause* of the Imagination that *Things turne Round*, is, for that the *Spirits* themselves turne, being compressed by the *Vapour* of the *Wine*: (For any *Liquid Body* upon *Compression*, turneth, as we see in *Water*:) And it is all one to the *Sight*, whether the *Visuall Spirits* move, or the *Object* moveth, or the *Medium* moveth. And wee see that long *Turning Round* breedeth the same Imagination. 725

The

The *Cause* of the Imagination that *Things come upon them*, is, for that the *Spirits Visuall* themselves draw backe; which maketh the *Object* seeme to come on; And besides, when they see Things turne Round, and Move, *Feare* maketh them thinke they come upon them. The *Cause* that they cannot see *Things a farre off*, is the *Weaknesse* of the *Spirits*; for in everie *Megrim*, or *Vertigo*, there is an *Obtenebration* joyned with a Semblance of *Turning round*; Which we see also in the lighter Sort of *Swounings*. The *Cause* of *Seeing things out of their Place*, is the *Refraction* of the *Spirits Visuall*; For the *Vapour* is as an *Vnequall Medium*; And it is, as the Sight of Things, out of place, in *Water*. The *Cause* of *Seeing Things double*, is, the *Swift* and *Vnquiet Motion* of the *Spirits*, (being Oppressed,) to and fro; For, (as was said before,) the *Motion* of the *Spirits Visuall*, and the *Motion* of the *Object*, make the same *Appearances*; And for the *Swift Motion* of the *Object*, wee see, that if you fillip a *Lute-String*, it sheweth double, or Treble.

726 *Men* are sooner *Drunke* with *Small Draughts*, than with *Great*. And againe, *Wine Sugred* inebriateth lesse, than *Wine Pure*. The *Cause* of the Former is, for that the *Wine* descendeth not so fast to the *Bottome* of the *Stomach*; But maketh longer Stay in the *Vpper Part* of the *Stomach*, and sendeth *Vapours* faster to the *Head*; And therefore inebriateth sooner. And, for the same Reason, *Sops* in *Wine*, (Quantitie for Quantitie,) inebriate more, than *Wine* of it selfe. The *Cause* of the Latter is, for that the *Sugar* doth inspissate the *Spirits* of the *Wine*, and maketh them not so easie to resolve into *Vapour*. Nay further, it is thought, to be some Remedy against *Inebriating*, if *Wine Sugred* be taken after *Wine Pure*. And the same Effect is wrought either by *Oyle*, or *Milke*, taken upon much *Drinking*.

Experiment Solitary, touching the *Help* or *Hurt* of *Wine*, though *Moderately used*.

727 THe *Vse* of *Wine*, in *Dry*, and *Consumed Bodies*, is hurtfull; In *Moist*, and *Full Bodies*, it is good. The *Cause* is, for that the *Spirits* of the *Wine* doe prey upon the *Dew*, or *Radicall Moisture*, (as they terme it,) of the *Body*, and so deceive the *Animall Spirits*. But where there is *Moisture* Enough, or Superfluous, there *Wine* helpeth to disgest, and desiccate the *Moisture*.

Experiment Solitary, touching *Catterpillers*.

728 THe *Catterpiller* is one of the most Generall of *Wormes*, and breedeth of *Dew*, and *Leaves*: For wee see infinite Number of *Catterpillers*, which breed upon *Trees*, and *Hedges*; By which the *Leaves* of the *Trees*, or *Hedges*, are in great Part consumed; As well by their Breeding out of the *Leafe*, as by their Feeding upon the *Leafe*. They breed in the *Spring* chiefly, because then there is both *Dew*, and *Leafe*. And they breed commonly when the *East Winds* have much blowne: The *Cause* whereof is, the *Drinesse* of that *Wind*: For to all *Vivification* upon *Putrefaction*, it is requisite the *Matter* be not too *Moist*: And therefore we see, they have *Copwebs* about them, which is a signe of a *Slimy Drinesse*: As we see upon the *Ground*, whereupon, by *Dew*, and *Sunne*, *Copwebs* breed all over.

We

We see also the *Greene Catterpiller* breedeth in the Inward Parts of *Roses*, especially not blowne, where the *Dew* sticketh: But especially *Catterpillers*, both the greatest, and the most, bred upon *Cabbages*, which have a *Fat Leafe*, and apt to *Putrifie*. The *Catterpiller* towards the *End* of *Summer* waxeth *Volatile*, and turneth to a *Butterfly*, or perhaps, some other *Fly*. There is a *Catterpiller*, that hath a *Furre*, or *Downe* upon him, and seemeth to have Affinitie with the *Silke-worme*.

Experiment Solitary, touching the *Flyes Cantharides*. 729

THe *Flyes Cantharides* are bred of a *Worme*, or *Catterpiller*, but peculiar to certaine *Fruit-Trees*; As are the *Fig-tree*, the *Pine-tree*, and the *Wilde Briar*; All which beare *Sweet Fruit*; And *Fruit* that hath a kinde of secret *Biting*, or *Sharpnesse*: For the *Fig* hath a *Milke* in it, that is *Sweet*, and *Corrosive*: The *Pine-Apple* hath a *Kernell* that is *Strong* and *Abstersive*: The *Fruit* of the *Briar* is said to make *Children*, or those that Eat them, *Scabbed*. And therefore, no marvell though *Cantharides* have such a *Corrosive*, and *Cauterizing Quality*; For there is not any other of the *Insecta*, but is bred of a *Duller Matter*. The *Body* of the *Cantharides* is bright coloured; And it may be, that the delicate coloured *Dragon-Flies*, may have likewise some *Corrosive Qualitie*.

Experiments in Consort, touching *Lassitude*. 730

Lassitude is remedied by *Bathing*, or *Annointing* with *Oyle*, and *Warme water*. The *Cause* is, for that all *Lassitude* is a kinde of *Contusion*, and *Compression* of the *Parts*; And *Bathing*, and *Annointing* give a *Relaxation*, or *Emollition*: And the *Mixture* of *Oyle*, and *Water*, is better than either of them alone; Because *Water* Entreth better into the *Pores*, and *Oyle* after Entry softneth better. It is found also, that the *Taking* of *Tobacco* doth helpe and discharge *Lassitude*. The *Reason* whereof is, partly, because by Chearing or Comforting of the *Spirits*, it openeth the *Parts Compressed*, or *Contused*: And chiefly, because it refresheth the *Spirits* by the *Opiate Vertue* thereof; And so dischargeth *Wearinesse*; as *Sleepe* likewise doth.

731

In *Going up a Hill*, the *Knees* will be most *Weary*; In *Going downe a Hill*, the *Thighes*. The *Cause* is, for that, in the *Lift* of the *Feet*, when a Man *Goeth up the Hill*, the Weight of the *Body* beareth most upon the *Knees*; And in *Going downe the Hill*, upon the *Thighes*.

Experiment Solitary, touching the *Casting* of the *Skin*, and *Shell*, in some *Creatures*. 732

THe *Casting* of the *Skin*, is by the *Ancients* compared, to the *Breaking* of the *Secundine*, or *Call*; but not rightly: For that were to make every *Casting* of the *Skin* a New *Birth*: And besides, the *Secundine* is but a generall *Cover*, not shaped according to the *Parts*; But the *Skin* is shaped according to the *Parts*. The *Creatures*, that cast their *Skin*, are; The *Snake*, the *Viper*, the *Grashopper*, the *Lizard* the *Silke-worme*, &c. Those that cast their *Shell*, are; The *Lobster*, the *Crab*, the *Crafish*, the *Hodmandod* or *Didman*, the *Tortoise*, &c. The *Old Skins* are found, but the *Old Shells* never: So as it is like, they scale off, and crumble away by degrees. And they are knowne, by the Extreame *Tendernesse* and *Softnesse*

of the *New Shell*; And somewhat by the *Freshnesse* of the *Colour* of it. The *Cause* of the *Casting* of *Skin*, and *Shell*, should seeme to be the great *Quantitie* of *Matter* in those *Creatures*, that is fit to make *Skin*, or *Shell*; And againe, the *Looseneſſe* of the *Skin*, or *Shell*, that sticketh not close to the *Flesh*. For it is certaine, that it is the *New Skin*, or *Shell*, that putteth off the *Old*: So we see, that in *Deere*, it is the *Young Horne*, that putteth off the *Old*; And in *Birds*, the *Young Feathers* put off the *Old*: And so *Birds*, that have much *Matter* for their *Beake*, cast their *Beakes*; the *New Beake* Putting off the *Old*.

Experiments in Consort, touching the *Postures* of the *Body*.

733 *Lying*, not *Erect*, but *Hollow*, which is in the Making of the Bed; Or with the *Legs gathered up*, which is in the Posture of the Body, is the more Wholesome. The *Reason* is, the better *Comforting* of the *Stomach*, which is by that lesse Pensile: And we see, that in Weake *Stomachs*, the Laying up of the Legs high, and the Knees almost to the Mouth, helpeth, and comforteth. We see also that *Gally-Slaves*, notwithstanding their Miserie otherwise, are commonly Fat and Fleshy; And the Reason is, because the *Stomach* is supported somewhat in *Sitting*; And is Pensile in *Standing*, or *Going*. And therefore, for *Prolongation* of *Life*, it is good to choose those *Exercises*, where the *Limbs* move more than the *Stomach*, and Belly; As in *Rowing*, and in *Sawing* being *Set*.

734 *Megrims* and *Giddineſſe* are rather when we *Rise*, after long *Sitting*, than while we *Sit*. The *Cause* is, for that the *Vapours*, which were gathered by *Sitting*, by the Sudden *Motion*, fly more up into the *Head*.

735 *Leaning long* upon any *Part* maketh it *Numme*, and, as wee call it, Asleepe. The *Cause* is, for that the *Compression* of the *Part* suffereth not the *Spirits* to have free Accesse; And therefore, when wee come out of it, wee feele a *Stinging*, or *Pricking*; Which is the *Re-entrance* of the *Spirits*.

Expetiment Solitary, touching *Pestilentiall Yeares*.

736 IT hath been noted, that those *Yeares* are *Pestilentiall*, and *Vnwholesome*, when there are great Numbers of *Frogs*, *Flyes*, *Locusts*, &c. The *Cause* is plaine; For that those *Creatures* being engendred of *Putrefaction*, when they abound, shew a generall *Disposition* of the *Yeare*, and *Constitution* of the *Aire*, to *Diseases* of *Putrefaction*. And the same *Prognosticke*, (as hath beene said before,) holdeth, if you finde *Wormes* in *Oake-Apples*. For the *Constitution* of the *Aire*, appeareth more subtilly, in any of these *Things*, than to the *Sense* of *Man*.

Experiment Solitary, touching the *Prognosticks* of *Hard Winters*.

737 IT is an Observation amongst *Country-People*, that *Yeares* of *Store* of *Hawes* & *Heps*, do commonly portend *Cold winters*; And they ascribe it to *Gods Providence*, that, (as the *Scripture* saith) reacheth even to the *Falling of a Sparrow*; And much more is like to reach to the *Preservation* of *Birds* in such *Seasons*. The *Naturall Cause* also may be the *Want* of *Heat*, and *Abundance* of *Moisture*, in the *Summer* precedent; Which putteth forth those *Fruits*, and must needs leave great *Quantitie* of *Cold Vapours*,

pours, not dissipate; Which causeth the *Cold* of the *Winter* following.

THey have in *Turkey*, a *Drinke* called *Coffa*, made of a *Berrie* of the same Name, as Blacke as *Soot*, and of a *Strong Sent*, but not *Aromaticall*; Which they take, beaten into Powder, in *Water*, as Hot as they can drinke it: And they take it, and sit at it, in their *Coffa-Houses*, which are like our *Tavernes*. This *Drinke* comforteth the *Braine*, and *Heart*, and helpeth *Digestion*. Certainly this *Berrie Coffa*; The *Root*, and *Leafe Betel*; The *Leafe Tobacco*; And the *Teare* of *Poppy*, (*Opium*,) of which the *Turks* are great Takers, (supposing it expelleth all Feare;) doe all Condense the *Spirits*, and make them Strong, and Aleger. But it seemeth they are taken after severall manners; For *Coffa* and *Opium* are taken downe; *Tobacco* but in *Smoake*; And *Betel* is but champed in the *Mouth*, with a little *Lime*. It is like there are more of them, if they were well found out, and well corrected. *Quære* of *Henbane-Seed*; Of *Mandrake*; Of *Saffron*, Root, and Flower; Of *Folium Indum*; Of *Amber-grice*; Of the *Assyrian Amomum*, if it may be had; And of the *Scarlet Powder*, which they call *Kermez*; And (generally) of all such Things, as doe inebriate, and provoke *Sleepe*. Note that *Tobacco* is not taken in *Root*, or *Seed*, which are more forcible ever than *Leaves*.

Experiment Solitary, touching *Medicines* that *Condense*, and *Relieve* the *Spirits*.

738

THe *Turkes* have a *Blacke Powder*, made of a *Minerall* called *Alcohole*; Which with a fine long Pencill they lay under their *Eye-lids*; Which doth colour them Blacke; Whereby the *White* of the *Eye* is set off more *white*. With the same *Powder* they colour also the *Haires* of their *Eye-lids*, and of their *Eye-browes*, which they draw into Embowed *Arches*. You shall finde that *Xenophon* maketh Mention, that the *Medes* used to paint their *Eyes*. The *Turkes* use with the same *Tincture*, to colour the *Haire* of their *Heads* and *Beards* Blacke: And divers with us, that are growne *Gray*, and yet would appeare *Young*, finde meanes to make their *Haire* blacke, by Combing it, (as they say,) with a Leaden Combe, or the like. As for the *Chineses*, who are of an ill Complexion, (being Olivaster,) they paint their *Cheekes* Scarlet; Especially their *King*, & *Grandes*. Generally, *Barbarous People*, that goe Naked, doe not onely paint Themselves, but they pownce and raze their Skinne, that the *Painting* may not be taken forth; And make it into Works. So doe the *West Indians*; And so did the Ancient *Picts*, and *Brittons*; So that it seemeth, *Men* would have the *Colours* of *Birds Feathers*, if they could tell how; Or at least, they will have *Gay Skins*, in stead of *Gay Cloathes*.

Experiment Solitary, touching *Paintings* of the *Body*.

739

IT is strange, that the *use* of *Bathing*, as a Part of *Diet*, is left. With the *Romans*, and *Grecians*, it was as usuall, as *Eating*, or *Sleeping*: And so is it amongst the *Turkes* at this day: Whereas with us it remaineth but as a *Part* of *Physicke*. I am of Opinion, that the Use of it, as it was with the *Romans*, was hurtfull to Health; For that it made the Body Soft, and easie to Waste. For the *Turkes* it is more proper, because that their *Drinking*

Experiment Solitary touching the *use* of *Bathing* and *Annointing*.

740

king Water, and *Feeding* upon *Rize*, and other Food of ſmall Nouriſhment, maketh their *Bodies* ſo Solide, and Hard, as you need not feare that *Bathing* ſhould make them *Froathy*. Beſides, the *Turkes* are great *Sitters*, and ſeldome walke; Whereby they Sweat leſſe, and need *Bathing* more. But yet certaine it is, that *Bathing*, and eſpecially *Annointing*, may be ſo uſed, as it may be a great Help to *Health*, and *Prolongation* of *Life*. But hereof we ſhall ſpeake in due Place, when we come to handle *Experiments Medicinall*.

Experiment Solitary, touching *Chamoletting* of *Paper*. 741

THe *Turkes* have a Prettie Art of *Chamoletting* of *Paper*, which is not with us in uſe. They take divers *Oyled Colours*, and put them ſeverally (in drops) upon *Water*; And ſtirre the *Water* lightly; And then wet their *Paper*, (being of ſome Thickneſſe,) with it; And the *Paper* will be Waved, and Veined, like *Chamolet*, or *Marble*.

Experiment Solitary, touching *Cuttle-Inke*. 742

IT is ſomewhat ſtrange, that the *Bloud* of all *Birds*, and *Beaſts*, and *Fiſhes*, ſhould be of a *Red Colour*, and onely the *Bloud* of the *Cuttle* ſhould be as *Blacke* as *Inke*. A Man would thinke, that the *Cauſe* ſhould be the *High Concoction* of that *Bloud*; For we ſee in ordinarie *Puddings*, that the *Boyling* turneth the *Bloud* to be *Blacke*; And the *Cuttle* is accounted a delicate *Meat*, and is much in Requeſt.

Experiment Solitary, touching *Encreaſe* of *weight* in *Earth*. 743

IT is reported of Credit, that if you take *Earth*, from Land adjoyning to the *River* of *Nile*; And preſerve it in that manner, that it neither come to be Wet, nor Waſted; And Weigh it daily, it will not alter *Weight* untill the ſeventeenth of *June*, which is the Day when the *River* beginneth to riſe; And then it will grow more and more *Ponderous*, till the *River* commeth to his Heighth. Which if it be true, it cannot be cauſed, but by the *Aire*, which then beginneth to Condenſe; And ſo turneth within that Small *Mould* into a degree of *Moiſture*; Which produceth *Weight*. So it hath beene obſerved, that *Tobacco*, Cut, and Wighed, and then Dried by the Fire, loſeth Weight; And after being laid in the open *Aire*, recovereth *Weight* againe. And it ſhould ſeeme, that as ſoone as ever the *River* beginneth to increaſe, the whole *Body* of the *Aire* thereabouts ſuffereth a Change: For (that which is more ſtrange,) it is credibly affirmed, that upon that verie Day, when the *River* firſt riſeth, great *Plagues*, in *Cairo*, uſe ſuddenly to breake up.

Experiments in Conſort touching *Sleepe*. 744

THoſe that are verie *Cold*, and eſpecially in their *Feet*, cannot get to *Sleepe*. The *Cauſe* may be, for that in *Sleepe* is required a *Free Reſpiration*, which *Cold* doth ſhut in, and hinder: For wee ſee, that in great *Colds*, one can ſcarce draw his *Breath*. Another *Cauſe* may be, for that *Cold* calleth the *Spirits* to ſuccour; And therefore they cannot ſo well cloſe, and goe together in the *Head*; Which is ever requiſite to *Sleepe*. And for the ſame *Cauſe*, *Paine*, and *Noiſe* hinder *Sleepe*; And *Darkneſſe* (contrariwiſe) furthereth *Sleepe*.

Some

Some *Noises* (whereof wee ſpake in the 112. *Experiment*) helpe *Sleepe*; As the *Blowing* of the *Wind*, the *Trickling* of *Water*, *Humming* of *Bees*, *Soft Singing*, *Reading*, &c. The *Cauſe* is, for that they move in the *Spirits* a gentle *Attention*; And whatſoever moveth *Attention*, without too much Labour, ſtilleth the Naturall and diſcurſive *Motion* of the *Spirits*. 745

Sleepe nouriſheth, or at leaſt preſerveth *Bodies*, a long time, without other *Nouriſhment*. *Beaſts* that ſleepe in *Winter*, (as it is noted of *wilde Beares*,) during their *Sleepe* wax verie Fat, though they Eat nothing. *Bats* have beene found in Ovens, and other Hollow Cloſe Places, Matted one upon another; And therefore it is likely that they *Sleepe* in the *winter time*, and eat Nothing. *Quære*, whether *Bees* doe not *Sleepe* all Winter, and ſpare their *Honey*? *Butterflies*, and other *Flies*, doe not onely *Sleepe*, but lye as *Dead* all *Winter*; And yet with a little *Heat* of *Sunne*, or *Fire*, revive againe. A *Dormouſe*, both *Winter* and *Summer*, will *Sleepe* ſome dayes together, and eat *Nothing*. 746

Experiments in Conſort touching *Teeth* and *Hard Subſtances* in the *Bodies* of *Living Creatures*.

To reſtore *Teeth* in *Age*, were *Magnale Naturæ*. It may be thought of. But howſoever the *Nature* of the *Teeth* deſerveth to be enquired of, as well as the other *Parts* of *Living Creatures Bodies*.

THere be Five *Parts* in the *Bodies* of *Living-Creatures*, that are of *Hard Subſtance*; The *Skull*; The *Teeth*; The *Bones*; The *Hornes*; & the *Nailes*. The greateſt *Quantitie* of *Hard Subſtance* Continued, is towards the *Head*. For there is the *Skull* of one Entire *Bone*; There are the *Teeth*; There are the *Maxillarie Bones*; There is the *Hard Bone*, that is the *Inſtrument* of *Hearing*; And thence iſſue the *Hornes*: So that the *Building* of *Living Creatures Bodies*, is like the *Building* of a *Timber-Houſe*, where the *Walls*, and other *Parts* have *Columnes*, and *Beames*; But the *Roofe* is, in the better Sort of *Houſes*, all *Tile*, or *Lead*, or *Stone*. As for *Birds*, they have Three other *Hard Subſtances* proper to them; The *Bill*, which is of like Matter with the *Teeth*; For no *Birds* have *Teeth*: The *Shell* of the *Egge*: And their *Quills*: For as for their *Spurre*, it is but a *Naile*. But no *Living-Creatures*, that have *Shells* verie hard; (As *Oyſters*, *Cockles*, *Muſſles*, *Scallops*, *Crabs*, *Lobſters*, *Cra-fiſh*, *Shrimps*, and eſpecially the *Tortoiſe*,) have *Bones* within them, but onely little *Griſtles*. 747

Bones, after full Growth, continue at a Stay: And ſo doth the *Skull*: *Hornes*, in ſome *Creatures*, are caſt, and renued: *Teeth* ſtand at a Stay except their Wearing: As for *Nailes*, they grow continually: And *Bills* and *Beakes* will over-grow, and ſometimes be caſt; as in *Eagles*, and *Parrots*. 748

Moſt of the *Hard Subſtances* fly to the *Extremes* of the *Body*; As *Skull*; *Hornes*, *Teeth*, *Nailes*, and *Beakes*: Onely the *Bones* are more *Inward*, and clad with *Fleſh*. As for the *Entrailes*, they are all without *Bones*; Save that a *Bone* is (ſometimes) found in the *Heart* of a *Stag*; And it may be in ſome other *Creature*. 749

750 The *Skull* hath *Braines*, as a kinde of *Marrow*, within it. The *Back-Bone* hath one Kinde of *Marrow*, which hath an Affinitie with the *Braine*; And other *Bones* of the *Body* have another. The *Iaw-Bones* have no *Marrow* Severed, but a little *Pulp* of *Marrow* diffused. *Teeth* likewise are thought to have a kinde of *Marrow* diffused, which causeth the *Sense*, and *Paine*: But it is rather *Sinnew*; For *Marrow* hath no *Sense*; No more than *Bloud*. *Horne* is alike throughout; And so is the *Naile*.

751 None other of the *Hard Substances* have *Sense*, but the *Teeth*: And the *Teeth* have *Sense*, not onely of *Paine*, but of *Cold*.

But we will leave the Enquiries *of other* Hard Substances, *unto their severall Places*; *And now enquire onely of the* Teeth.

752 The *Teeth* are, in *Men*, of three Kindes: *Sharp*, as the *Fore-Teeth*; *Broad*, as the *Back-Teeth*, which we call the *Molar-Teeth*, or *Grinders*; And *Pointed-Teeth*, or *Canine*, which are betweene both. But there have been some *Men*, that have had their *Teeth undivided*, as of one whole *Bone*, with some little Marke in the Place of the Division; As *Pyrrhus* had. Some *Creatures* have *Over-long*, or *Out-growing Teeth*, which wee call *Fangs*, or *Tuskes*; As *Boares*, *Pikes*, *Salmons*, and *Dogs* though lesse. Some *Living Creatures* have *Teeth* against *Teeth*; As *Men*, and *Horses*; And some have *Teeth*, especially their *Master-Teeth*, indented one within another, like *Sawes*; As *Lions*; And so againe have *Dogs*. Some *Fishes* have divers *Rowes* of *Teeth* in the *Roofes* of their *Mouths*; As *Pikes*, *Salmons*, *Trouts*, &c. And many more in *Salt-Waters*. *Snakes*, and other *Serpents*, have *Venomous Teeth*; which are sometimes mistaken for their *Sting*.

753 No *Beast* that hath *Hornes*, hath *Vpper Teeth*; And no *Beast*, that hath *Teeth* above, wanteth them below: But yet if they be of the same kinde, it followeth not, that if the *Hard Matter* goeth not into *Vpper Teeth*, it will goe into *Hornes*; Nor yet *è converso*; For *Doe's*, that have no *Hornes*, have no *Vpper Teeth*.

754 *Horses* have, at three yeares old, a *Tooth* put forth, which they call the *Colts Tooth*; And at foure yeares old there commeth the *Mark-Tooth*, which hath a *Hole*, as big as you may lay a *Pease* within it; And that weareth shorter and shorter, everie yeare; Till that at eight yeares old, the *Tooth* is smooth, and the *Hole* gone; And then they say; *That the Marke is out of the Horses Mouth*.

755 The *Teeth* of *Men* breed first, when the *Childe* is about a yeare and halfe old: And then they cast them, and new come about seven yeares old. But divers have *Backward-Teeth* come forth at Twentie, yea some at Thirtie, and Fortie. *Quære* of the manner of the *Comming* of them forth. They tell a Tale of the old *Countesse* of *Desmond*, who lived till shee was seven-score yeares old, that shee did *Dentire*, twice, or thrice; Casting her old *Teeth*, and others Comming in their Place.

756 *Teeth* are much hurt by *Sweet-Meats*; And by *Painting* with *Mercurie*; And by *Things Over-hot*; And by *Things Over-cold*; And by *Rheumes*. And the *Paine* of the *Teeth*, is one of the sharpest of *Paines*.

Concerning

757

Concerning *Teeth*, these Things are to be Considered. 1. The *Preserving* of them. 2. The *Keeping* of them *White*. 3. The *Drawing* of them with *Least Paine*. 4. The *Staying* and *Easing* of the *Tooth-ach*. 5. The *Binding* in of *Artificiall Teeth*, where *Teeth* have beene strucken out. 6. And last of all, that Great One, of *Restoring Teeth* in *Age*. The *Instances* that give any likelihood of *Restoring Teeth* in *Age*, are; The *Late Comming* of *Teeth* in some; And the *Renewing* of the *Beakes* in *Birds*, which are Commateriall with *Teeth*. *Quære* therefore more particularly how that commeth. And againe, the *Renewing* of *Hornes*. But yet that hath not beene knowne to have beene provoked by *Art*; Therfore let *Triall* be made, whether *Hornes* may be procured to grow in *Beasts* that are not *Horned*, and how? And whether they may be procured to come *Larger* than usuall; As to make an *Oxe*, or a *Deere*, have a *Greater Head* of *Hornes*? And whether the *Head* of a *Deere*, that by *Age* is more *Spitted*, may be brought againe to be more *Branched*; For these *Trialls*, and the like, will shew, whether by *Art* such *Hard Matter* can be called, and provoked. It may be tried also, whether *Birds* may not have some thing done to them, when they are *Young*, wherby they may be made to have *Greater*, or *Longer Bills*; Or *Greater* and *Longer Tallons*? And whether *Children* may not have some *Wash*, or Some thing to make their *Teeth Better*, and *Stronger*? *Corall* is in use as an Help to the *Teeth* of *Children*.

Experiments in Consort, touching the *Generation* & *Bearing* of *Living Creatures* in the *Wombe*.

758

SOme *Living Creatures generate* but at certaine *Seasons* of the *Yeare*; As *Deere*, *Sheepe*, *Wilde Conneyes*, &c. And most Sorts of *Birds*, and *Fishes*: Others at *any time* of the *Yeare*, as *Men*; And all *Domestick Creatures*; As *Horses*, *Hogs*, *Dogs*, *Cats*, &c. The *Cause* of *Generation* at *all Seasons* seemeth to be *Fulnesse*: For *Generation* is from *Redundance*. This *Fulnesse* ariseth from two *Causes*; Either from the *Nature* of the *Creature*, if it be *Hot*, and *Moist*, and *Sanguine*; Or from *Plentie* of *Food*. For the first, *Men*, *Horses*, *Dogs*, &c. which breed at all Seasons, are full of *Heat*, and *Moisture*; *Doves* are the fullest of *Heat* and *Moisture* amongst *Birds*, and therefore breed often; The *Tame Dove* almost continually. But *Deere* are a *Melancholy Dry Creature*, as appeareth by their *Fearefulnesse*, and the *Hardnesse* of their *Flesh*. *Sheepe* are a *Cold Creature*, as appeareth by their *Mildnesse*, and for that they seldome *Drinke*. Most sort of *Birds* are of a dry *Substance* in comparison of *Beasts*. *Fishes* are cold. For the second *Cause*, *Fulnesse* of *Food*; *Men*, *Kine*, *Swine*, *Dogs*, &c. feed full; And we see that those *Creatures*, which being *Wilde*, generate seldome, being *Tame*, generate often; Which is from *Warmth*, and *Fulnesse* of *Food*. We finde, that the Time of *Going* to *Rut* of *Deere* is in *September*; For that they need the whole *Summers Feed* and *Grasse*, to make them fit for *Generation*. And if *Raine* come Earely about the Middle of *September*, they goe to Rut somewhat the sooner; If *Drought*, somewhat the later. So *Sheepe*, in respect of their small *Heat*, generate about the same time, or somewhat before. But for the most part, *Creatures* that generate at certaine

taine *Seasons*, generate in the *Spring*; As *Birds*, and *Fishes*; For that the *End* of the *Winter*, and the *Heat*, and *Comfort* of the *Spring* prepareth them. There is also another *Reason*, why some *Creatures* generate at certaine *Seasons*: And that is the *Relation* of their *Time* of *Bearing*, to the time of Generation: For no *Creature* goeth to generate, whilest the *Female* is full; Nor whilest shee is busie in *Sitting* or *Rearing* her *Young*. And therefore it is found by Experience, that if you take the *Egges*, or *Young Ones*, out of the *Neasts* of *Birds*, they will fall to generate againe, three or foure times, one after another.

759 Of *Living Creatures*, some are *Longer time* in the *Womb*, and some *Shorter*. *Women* goe commonly nine *Moneths*; The *Cow* and the *Ewe* about six Moneths; *Doe's* goe about nine Moneths; *Mares* eleven Moneths; *Bitches* nine Weekes; *Elephants* are said to goe two Yeares; For the Received *Tradition* of ten Yeares is *Fabulous*. For *Birds* there is double Enquirie; The *Distance* betweene the *Treading* or *Coupling*, and the *Laying* of the *Egge*; And againe betweene the *Egge Layed*, and the *Disclosing* or *Hatching*. And amongst *Birds*, there is lesse *Diversitie* of *Time*, than amongst other *Creatures*; yet some there is: For the *Hen* sitteth but three Weekes; The *Turky-Hen*, *Goose*, and *Ducke*, a Moneth: *Quære* of others. The *Cause* of the great *Difference* of *Times*, amongst *Living Creatures*, is, Either from the *Nature* of the *Kinde*; Or from the *Constitution* of the *Womb*. For the former, those that are longer in *Comming* to their *Maturitie* or *Growth*, are longer in the *Womb*; As is chiefly seene in *Men*; And so *Elephants* which are long in the *Womb*, are long time in *Comming* to their full *Growth*. But in most other Kindes, the *Constitution* of the *Womb*, (that is, the *Hardnesse* or *Drinesse* thereof,) is concurrent with the former *Cause*. For the *Colt* hath about foure yeares of *Growth*; And so the *Fawne*; And so the *Calfe*. But *Whelps*, which come to their *Growth* (commonly) within three Quarters of a yeare, are but nine Weekes in the *Womb*. As for *Birds*, as there is lesse Diversitie, amongst them, in the time of their *Bringing forth*; So there is lesse Diversitie in the time of their *Growth*; Most of them comming to their *Growth* within a Twelve-Moneth.

760 Some *Creatures* bring forth many *Young Ones* at a *Burthen*; As *Bitches*, *Hares*, *Conneyes*, &c. Some (ordinarily) but *One*; As *women*, *Lionesses*, &c. This may be caused, either by the *Quantitie* of *Sperme* required to the *Producing* One of that Kinde; which if lesse be required, may admit greater Number; If more, fewer: Or by the *Partitions* and *Cells* of the *Womb*, which may sever the *Sperme*.

Experiments in Consort, touching *Species Visible*.

761 THere is no doubt, but *Light* by *Refraction* will shew greater, as well as *Things Coloured*. For like as a *Shilling*, in the *Bottome* of the *Water*, will shew greater; So will a *Candle* in a *Lanthorne*, in the *Bottome* of the *Water*. I have heard of a Practice, that *Glo-wormes* in *Glasses* were put in the *Water*, to make the *Fish* come. But I am not yet informed, whether when a *Diver* Diveth, having his *Eyes* open, and swimmeth upon his *Backe*;

Backe; whether (I say) he seeth *Things* in the *Aire* greater, or lesse. For it is manifest, that when the *Eye* standeth in the *Finer Medium*, and the *Object* is in the *Grosser*, things shew greater; But contrariwise, when the *Eye* is placed in the *Grosser Medium*, and the *Object* in the *Finer*, how it worketh I know not.

762 It would be well boulted out, whether great *Refractions* may not be made upon *Reflexions*, as well as upon *Direct Beames*. For Example, We see that take an *Emptie Bason*, put an *Angell* of *Gold*, or what you will, into it; Then goe so farre from the *Bason*, till you cannot see the *Angell*, because it is not in a *Right Line*; Then fill the *Bason* with *Water*, and you shall see it out of his Place, because of the *Reflexion*. To proceed therefore, put a *Looking-Glasse* into a *Bason* of *Water*; I suppose you shall not see the *Image* in a *Right Line*, or at equall *Angles*, but aside. I know not, whether this *Experiment* may not be extended so, as you might see the *Image*, and not the *Glasse*; Which for *Beautie*, and *Strangenesse*, were a fine Proofe: For then you should see the *Image* like a *Spirit* in the *Aire*. As for Example, If there be a *Cesterne* or *Poole* of *Water*, you shall place over against it a *Picture* of the *Devill*, or what you will, so as you doe not see the *Water*. Then put a *Looking-Glasse* in the *water*: Now if you can see the *Devills Picture* aside, not seeing the *Water*, it will looke like a *Devill* indeed. They have an old tale in *Oxford*, that *Friar Bacon* walked betweene two *Steples*: Which was thought to be done by *Glasses*, when he walked upon the *Ground*.

Experiments in Consort touching *Impulsion*, and *Percussion*.

763 A *Weightie Body* put into *Motion*, is more easily impelled, than at first when it *Resteth*. The *Cause* is, Partly because *Motion* doth discusse the *Torpour* of *Solide Bodies*; Which beside their *Motion* of *Gravitie*, have in them a *Naturall Appetite*, not to move at all; And partly, because a *Body* that resteth, doth get, by the *Resistance* of the *Body* upon which it resteth, a stronger *Compression* of *Parts*, than it hath of it Selfe: And therefore needeth more Force to be put in *Motion*. For if a *Weightie Body* be Pensile, and hang but by a *Thred*, the *Percussion* will make an *Impulsion* verie neare as easily, as if it were already in *Motion*.

764 A *Body Over-great*, or *Over-small*, will not be throwne so farre, as a *Body* of a *Middle Size*: So that (it seemeth) there must be a *Commensuration*, or *Proportion*, betweene the *Body Moved*, and the *Force*, to make it move well. The *Cause* is, because to the *Impulsion*, there is requisite the *Force* of the *Body* that *Moveth*, and the *Resistance* of the *Body* that is *Moved*: And if the *Body* be *too great*, it yeeldeth too little; And if it be *too small*, it resisteth too little.

765 It is *Common Experience*, that no *Weight* will presse or cut so strong, being laid upon a *Body*, as Falling, or strucken from above. It may be the *Aire* hath some part in furthering the *Percussion*: But the chiefe *Cause* I take to be, for that the *Parts* of the *Body Moved*, have by *Impulsion*, or by the *Motion* of *Gravitie continued*, a *Compression* in them, as well downwards, as they have when they are throwne, or Shot thorow the *Aire*, forwards.

forwards. I conceive also, that the quicke *Loose* of that *Motion*, preventeth the *Resistance* of the *Body* below; And *Prioritie* of the *Force*, (alwayes,) is of great *Efficacie*; As appeareth in infinite *Instances*.

Experiment Solitary, touching *Titillation*. 766

Tickling is most in the *Soles* of the *Feet*, and under the *Arme-Holes*, and on the *Sides*. The *Cause* is, the *Thinnesse* of the *Skin* in those *Parts*; Ioyned with the Rareneſſe of being touched there. For all *Tickling* is a light *Motion* of the *Spirits*, which the *Thinnesse* of the *Skin*, and *Suddennesse*, and *Rareneſſe* of *Touch*, doe further: For we see, a *Feather*, or a *Rush*, drawne along the *Lip*, or *Cheeke*, doth tickle; Whereas a *Thing* more *Obtuse*, or a *Touch* more *Hard*, doth not. And for *Suddennesse*; We see no *Man* can tickle himselfe: We see also, that the *Palme* of the *Hand*, though it hath as *Thin* a *Skin*, as the other *Parts* Mentioned, yet is not Tickliſh, because it is accustomed to be Touched. *Tickling* also causeth *Laughter*. The *Cause* may be, the *Emission* of the *Spirits*, and so of the *Breath*, by a *Flight* from *Titillation*; For upon *Tickling*, wee see there is ever a *Starting*, or *Shrinking* away of the Part, to avoid it; And we see also, that if you Tickle the *Nostrills*, with a *Feather*, or *Straw*, it procureth *Sneezing*; Which is a *Sudden Emission* of the *Spirits*, that doe likewise expell the *Moisture*. And *Tickling* is ever Painfull, and not well endured.

Experiment Solitary, touching the *Scarcitie* of *Raine* in *Ægypt*. 767

IT is strange, that the *River* of *Nilus*, Over-flowing, as it doth, the *Countrey* of *Ægypt*, there should be nevertheleſſe little or no *Raine* in that *Countrey*. The *Cause* must be, Either in the *Nature* of the *Water*; Or in the *Nature* of the *Aire*; Or of Both. In the *Water*, it may be ascribed, either unto the *Long Race* of the *Water*: For *Swift Running Waters* vapour not so much as *Standing Waters*; Or else to the *Concoction* of the *Water*; For *Waters* well *Concocted* vapour not so much, as *Waters Raw*; No more than *Waters* upon the Fire doe vapour so much, after some time of Boyling, as at the first. And it is true, that the *Water* of *Nilus* is sweeter than other *Waters* in Taste; And it is excellent Good for the *Stone*, and *Hypochondriacall Melancholy*; Which sheweth it is *Lenefying*: And it runneth thorow a *Countrey* of a *Hot Climate*, and flat, without Shade, either of *Woods*, or *Hills*; Whereby the *Sunne* must needs have great Power to *Concoct* it. As for the *Aire*, (from whence I conceive this Want of Showers commeth chiefly;) The *Cause* must be, for that the *Aire* is, of it selfe, *Thin* and *Thirstie*; And as soone as ever it getteth any *Moisture* from the *Water*, it imbibeth, and dissipateth it, in the whole body of the *Aire*; And suffereth it not to remaine in *Vapour*; Whereby it might breed *Raine*.

Experiment Solitary, touching *Clarification*. 768

IT hath beene touched in the *Title* of *Percolations*, (Namely such as are *Inwards*,) that the *Whites* of *Eggs*, and *Milke*, doe clarifie; And it is certaine, that in *Ægypt*, they prepare and clarifie the *Water* of *Nile*, by putting it into great *Iarres* of *Stone*, and Stirring it about with a few

Stamped

Stamped *Almonds*; Wherewith they also besmeare the Mouth of the *Vessell*; And so draw it off, after it hath rested some time. It were good, to trie this *Clarifying* with *Almonds*, in *New Beere*, or *Must*, to hasten, and perfect the *Clarifying*.

Experiment Solitary, touching *Plants* without *Leaves*. 769

THere be scarce to be found any *Vegetables*, that have *Branches*, and no *Leaves*; except you allow *Corall* for one. But there is also in the *Desarts* of *S. Macario* in *Ægypt*, a *Plant* which is Long, Leavelesse, Browne of Colour, and Branched like *Corall*, save that it closeth at the *Top*. This being set in *Water* within *House*, spreadeth and displayeth strangely; And the People thereabouts have a Superstitious Beleefe, that in the *Labour* of *Women*, it helpeth to the *Easie Deliverance*.

Experiment Solitary, touching the *Materials* of *Glasse*. 770

THe *Crystalline Venice Glasse*, is reported to be a Mixture, in equall Portions, of *Stones*, brought from *Pavia*, by the *River Ticinum*; And the *Ashes* of a *Weed* called by the *Arabs Kali*, which is gathered in a *Desart* betweene *Alexandria* and *Rosetta*; And is by the *Ægyptians* used first for Fuell; And then they crush the *Ashes* into Lumps, like a *Stone*; And so sell them to the *Venetians* for their *Glasse-works*.

Experiment Solitary, touching *Probibition* of *Putrefaction*, and the *Long Conservation* of *Bodies*. 771

IT is strange, and well to be noted, how long *Carkasses* have continued *Uncorrupt*, and in their former *Dimensions*; As appeareth in the *Mummies* of *Ægypt*; Having lasted, as is conceived, (some of them,) three thousand yeares. It is true, they finde Meanes to draw forth the *Braines*, and to take forth the *Entrailes*, which are the *Parts* aptest to corrupt. But that is nothing to the Wonder: For we see, what a Soft and Corruptible *Substance* the *Flesh*, of all the other *Parts* of the *Body*, is. But it should seeme, that according to our *Observation*, and *Axiome*, in our hundredth *Experiment*, *Putrefaction*, which wee conceive to be so *Naturall* a *Period* of *Bodies*, is but an *Accident*; And that *Matter* maketh not that Haste to *Corruption*, that is conceived. And therefore *Bodies*, in *Shining-Amber*; In *Quicke-Silver*; In *Balmes*, (whereof wee now speake;) In *Wax*; In *Honey*; In *Gummes*; And (it may be) in *Conservatories* of *Snow*; &c. are preserved verie long. It need not goe for Repetition, if we resume againe that which wee said in the aforesaid *Experiment*, concerning *Annihilation*; Namely, that if you provide against three *Causes* of *Putrefaction*, *Bodies* will not corrupt: The First is, that the *Aire* be *excluded*; For that undermineth the *Body*, and conspireth with the *Spirit* of the *Body* to dissolve it. The Second is, that the *Body Adjacent* and *Ambient* be not Commateriall, but meerely Heterogeneall towards the Body that is to be preserved: For if nothing can be received by the One, Nothing can issue from the Other; Such are *Quick-Silver*, and *White-Amber*, to *Herbs*, & *Flies*, and such *Bodies*. The Third is, that the *Body* to be preserved, be not of that *Grosse*, that it may corrupt within it selfe, although no Part of it issue into the *Body Adjacent*: And therefore it must be rather *Thin*, and *Small*, than of *Bulke*. There is a Fourth *Remedie* also, which is;

That

That if the *Body* to be preserved be of *Bulke*, as a *Corps* is, then the *Body* that incloseth it, must have a Vertue to draw forth, and drie the *Moisture* of the *Inward Body*; For else the *Putrefaction* will play within, though Nothing issue forth. I remember *Livy* doth relate, that there were found, at a time, two *Coffins* of *Lead*, in a *Tombe*; Whereof the one contained the *Body* of *King Numa*; It being some foure hundred yeares after his Death: And the other, his *Bookes* of *Sacred Rites* and *Ceremonies*, and the *Discipline* of the *Pontifes*; And that in the *Coffin* that had the *Body*, there was Nothing (at all) to be seene, but a little light *Cinders* about the *Sides*; But in the *Coffin* that had the *Bookes*, they were found as fresh, as if they had been but newly Written; being written in *Parchment*, and couered over with *Watch-Candles* of *Wax*, three or foure fold. By this it seemeth, that the *Romans*, in *Numa's* time, were not so good *Embalmers*, as the *Ægyptians* were; Which was the *Cause* that the Body was utterly consumed. But I finde in *Plutarch*, and Others, that when *Augustus Cæsar* visited the *Sepulchre* of *Alexander* the *Great*, in *Alexandria*, he found the *Body* to keepe his *Dimension*; But withall, that, notwithstanding all the *Embalming*, (which no doubt was of the best,) the *Body* was so Tender, as *Cæsar* touching but the *Nose* of it, defaced it. Which maketh mee finde it very strange, that the *Ægyptian Mummies* should be reported to be as Hard as *Stone-Pitch*: For I finde no difference but one; Which indeed may be very Materiall; Namely, that the Ancient *Ægyptian Mummies*, were shrowded in a Number of Folds of *Linnen*, besmeared with *Gums*, in manner of *Seare-Cloth*; Which it doth not appeare was practised upon the *Body* of *Alexander*.

Experiment Solitary, touching the *Abundance* of *Nitre* in certaine *Sea-Shoares*.

772

NEare the *Castle* of *Catie*, and by the *Wells* of *Assan*, in the *Land* of *Idumea*, a great Part of the Way, you would thinke the *Sea* were neare hand, though it be a good distance off: And it is Nothing, but the *Shining* of the *Nitre*, upon the *Sea-Sands*; Such *Abundance* of *Nitre* the *Shores* there doe put forth.

Expetiment Solitary, touching *Bodies* that are *borne up* by *Water*.

773

THe *Dead-Sea*, which vomiteth up *Bitumen*, is of that *Crassitude*, as *Living Bodies* bound Hand and Foot, cast into it, have beene borne up, and not sunke. Which sheweth, that all *Sinking* into *Water*, is but an *Over-weight* of the *Body*, put into the *Water*, in respect of the *Water*: So that you may make *Water* so strong, and heauy, of *Quicke-Silver*, (perhaps,) or the like, as may beare up *Iron*: Of which I see no Use, but Imposture. Wee see also, that all *Metalls*, except *Gold*, for the same reason, swimme upon *Quicke-Silver*.

Experiment Solitary, touching *Fuell*, that *consumeth little*, or *nothing*.

774

IT is reported, that at the *Foot* of a *Hill*, neare the *Mare mortuum*, there is a *Blacke Stone*, (whereof *Pilgrims* make Fires,) which burneth like a *Coale*, and diminisheth not; But onely waxeth Brighter, and Whiter. That it should doe so, is not strange; For we see *Iron* Red Hot burneth, and consumeth not: But the Strangenesse is, that it should continue any time

time so: For *Iron*, as soone as it is out of the Fire, deadeth straight-waies. Certainly, it were a Thing of great Use, and Profit, if you could finde out *Fuell*, that would burne Hot, and yet last long: Neither am I altogether Incredulous, but there may be such *Candles*, as they say are made of *Salamanders Wooll*; Being a Kinde of *Minerall*, which whiteneth also in the Burning, and consumeth not. The Question is this; *Flame* must be made of somewhat; And commonly it is made of some *Tangible Body*, which hath *weight*: But it is not impossible, perhaps, that it should be made of *Spirit*, or *Vapour*, in a *Body*; (which *Spirit* or *Vapour* hath no *Weight*;) such as is the Matter of *Ignis Fatuus*. But then you will say, that that *Vapour* also can last but a short time: To that it may be answered, That by the helpe of *Oile*, and *Wax*, and other *Candle-Stuffe*, the *Flame* may continue, and the *Wieke* not burne.

Experiment Solitary *Oeconomicall* touching *Cheape Fuell*. 775

Sea-Coale last longer than *Char-Coale*; And *Char-coale* of *Roots*, being coaled into great Peeces, last longer than Ordinary *Char-Coale*. *Turfe*, and *Peat*, and *Cow-Sheards*, are cheape *Fuels*, and last long. *Small-Coale*, or *Briar-Coale*, powred upon *Char-Coale*, make them last longer. *Sedge* is a cheape *Fuell* to Brew, or Bake with; the rather because it is good for Nothing else. Triall would be made of some Mixture of *Sea-Coale* with *Earth*, or *Chalke*; For if that *Mixture* be, as the *Sea-Coale-Men* use it, privily, to make the Bulke of the *Coale* greater, it is Deceit; But if it be used purposely, and be made knowne, it is Saving.

Experiment Solitary, touching the *Gathering* of *Wind* for *Freshnesse*. 776

IT is, at this Day, in use, in *Gaza*, to couch *Pot-Sheards* or *Vessels* of *Earth*, in their *Walls*, to gather the *Wind* from the Top, and to passe it downe in Spouts into *Roomes*. It is a Device for *Freshnesse*, in great Heats: And it is said, there are some *Roomes* in *Italie*, and *Spaine*, for *Freshnesse*, and *Gathering* the *Winds*, and *Aire*, in the *Heats* of *Summer*. But they be but *Pennings* of the *Winds*, and *Enlarging* them againe, and *Making* them *Reverberate*, and *goe Round* in *Circles*, rather than this *Device* of *Spouts* in the *Wall*.

Experiment Solitary, touching the *Trials* of *Aires*. 777

THere would be used much diligence, in the Choice of some *Bodies*, and *Places*, (as it were,) for the *Tasting* of *Aire*; to discover the *wholesomenesse* or *Unwholesomenesse*, as well of *Seasons*, as of the *Seats* of *Dwellings*. It is certaine, that there be some *Houses*, wherein *Confitures*, and *Pies*, will gather *Mould*, more than in Others. And I am perswaded, that a *Peece* of *Raw Flesh*, or *Fish*, will sooner corrupt in some *Aires*, than in Others. They be noble *Experiments*, that can make this *Discoverie*. For they serve for a *Naturall Divination* of *Seasons*; Better than the *Astronomers* can by their *Figures*: And againe, they teach *Men* where to chuse their *Dwelling*, for their better *Health*.

Experiment Solitary, touching *Increa-*

THere is a Kinde of *Stone*, about *Bethleem*, which they grinde to *Powder*, and put into *Water*, whereof *Cattell* drinke; Which maketh them

fing of *Milke* in *Milch Beasts*. 778

give more *Milke*. Surely, there would be some better Trialls made of *Mixtures* of *Water* in *Ponds* for *Cattell*, to make them more *Milch*; Or to *Fatten* them; Or to *Keepe* them from *Murraine*. It may be, *Chalke*, and *Nitre*, are of the best.

Experiment Solitary, touching *Sand* of the *Nature* of *Glasse*. 779

IT is reported, that in the *Valley*, neare the *Mountaine Carmel*, in *Iudea*, there is a *Sand*, which, of all other, hath most Affinitie with *Glasse*; Insomuch as other *Mineralls*, laid in it, turne to a *Glassie Substance*, without the *Fire*; And againe *Glasse* put into it, turneth into the *Mother-Sand*. The Thing is very strange, if it be true: And it is likeliest to be Caused by some *Naturall Fornace*, or *Heat* in the *Earth*: And yet they doe not speake of any *Eruption* of *Flames*. It were good to trie in *Glasse-Workes*, whether the *Crude Materialls* of *Glasse*, mingled with *Glasse*, already made and Re-moulten, doe not facilitate the *Making* of *Glasse* with lesse *Heat*.

Experiment Solitary, touching the *Growth* of *Corall*. 780

IN the *Sea*, upon the *South-west* of *Sicilie*, much *Corall* is found. It is a *Sub-Marine Plant*. It hath no *Leaves*: It brancheth onely when it is under *Water*; It is *Soft*, and *Greene* of *Colour*; But being brought into the *Aire*, it becommeth *Hard*, and *Shining* Red, as we see. It is said also, to have a *White Berry*; But we finde it not brought over with the *Corall*. Belike it is cast away as nothing worth: Inquire better of it, for the *Discoverie* of the *Nature* of the *Plant*.

Experiment Solitary, touching the *Gathering* of *Manna*. 781

THe *Manna* of *Calabria* is the best, and in most Plenty. They gather it from the *Leafe* of the *Mulberry Tree*; But not of such *Mulberry Trees*, as grow in the *Valley's*. And *Manna* falleth upon the *Leaves* by *Night*, as other *Deawes* doe. It should seeme, that before those *Deawes* come upon *Trees* in the *Valley's*, they dissipate, and cannot hold out. It should seeme also, the *Mulberry-Leafe*, it selfe, hath some Coagulating Vertue, which inspissateth the *Deaw*, for that it is not found upon other *Trees*: And we see by the *Silke-Worme*, which feedeth upon that *Leafe*, what a Dainty Smooth *Iuyce* it hath; And the *Leaves* also, (especially of the Blacke *Mulberry*,) are somewhat Bristly, which may helpe to preserve the *Deaw*. *Certainly*, it were not amisse, to observe a little better, the *Deawes* that fall upon *Trees*, or *Herbs*, Growing on *Mountaines*; For, it may be, many *Deawes* fall, that spend before they come to the *Valleys*. And I suppose, that he that would gather the best *May-Deaw* for *Medicine*, should gather it from the *Hills*.

Experiment Solitary, touching the *Correcting* of *Wine*. 782

IT is said, they have a manner, to prepare their *Greeke-Wines*, to keepe them from *Fuming*, and *Inebriating*, by adding some *Sulphur*, or *Allome*: Whereof the one is *Vnctuous*, and the other is *Astringent*. And certaine it is, that those two *Natures* doe best represse *Fumes*. This *Experiment* would be transferred, unto other *Wine*, and *Strong Beere*, by Putting in some like *Substances*, while they worke; Which may make them both to *Fume* lesse, and to *Inflame* lesse.

It

IT is conceived by ſome, (not improbably,) that the reaſon, why *wilde-Fires*, (Whereof the principall Ingredient is *Bitumen*,) doe not quench with *Water*, is, for that the firſt *Concretion* of *Bitumen* is a *Mixture*, of a *Fiery*, and *watry Subſtance*: So is not *Sulphur*. This appeareth, for that in the *Place* neare *Puteoli*, which they call the *Court* of *Vulcan*, you ſhall heare, under the *Earth*, a Horrible Thundring of *Fire*, and *Water*, conflicting together: And there breake forth alſo *Spouts* of *Boyling Water*. Now that *Place* yeeldeth great *Quantities* of *Bitumen*; Whereas *Ætna*, and *Veſuvius*, and the like, which conſiſt upon *Sulphur*, ſhoot forth *Smoake*, and *Aſhes*, and *Pumice*, but no *Water*. It is reported alſo, that *Bitumen* Mingled with *Lime*, and Put under *Water*, will make, as it were, an *Artificiall Rocke*; The *Subſtance* becommeth ſo Hard.

Experiment Solitary, touching the *Materialls* of *Wild-Fire*.

783

THere is a *Cement*, compounded of *Flower*, *whites* of *Egges*, and *Stone powdred*, that becommeth Hard as *Marble*; wherewith *Piſcina mirabilis*, neare *Cuma*, is ſaid to have the *Walls* Plaſtered. And it is certaine, and tried, that the *Powder* of *Load-Stone*, and *Flint*, by the Addition of *Whites* of *Egges*, and *Gumm-Dragon*, made into *Paſte*, will in a few dayes harden to the Hardneſſe of a *Stone*.

Experiment Solitary, touching *Plaſter* growing as *Hard* as *Marble*.

784

IT hath beene noted by the *Ancients*, that in *Full* or *Impure Bodies*, *Vlcers* or Hurts in the *Leggs*, are Hard to Cure; And in the *Head* more Eaſie. The *Cauſe* is, for that *Vlcers* or *Hurts* in the *Leggs* require *Deſiccation*, which by the *Defluxion* of *Humours* to the *Lower Parts* is hindred; Whereas *Hurts* and *Vlcers* in the *Head* require it not; But contrariwiſe *Drineſſe* maketh them more apt to Conſolidate. And in Moderne Obſervation, the like difference hath beene found, betweene *French-Men*, and *Engliſh-men*; Whereof the ones *Conſtitution* is more *Dry*, and the others more *Moiſt*. And therefore a *Hurt* of the *Head* is harder to cure in a *French-Man*, and of the *Legge* in an *Engliſh-Man*.

Experiment Solitary, touching *Iudgement* of the *Cure* in ſome *Vlcers* and *Hurts*.

785

IT hath beene noted by the *Ancients*, that *Southerne Winds*, blowing much, without *Raine*, doe cauſe a *Fevourous Diſpoſition* of the *Yeare*; But with *Raine*, not. The *Cauſe* is, for that *Southerne Winds* doe, of themſelves, qualifie the *Aire*, to be apt to cauſe *Fevers*; But when *Showers* are joyned, they doe Refrigerate in Part, and Checke the Sultry *Heat* of the *Southerne Wind*. Therefore this holdeth not in the *Sea-Coaſts*, becauſe the *Vapour* of the *Sea*, without *Showers*, doth refreſh.

Experiment Solitary, touching the *Healthfulneſſe* or *Vnhealthfulneſſe* of the *Southerne Wind*.

786

IT hath beene noted by the *Ancients*, that *Wounds* which are made with *Braſſe*, heale more eaſily, than *Wounds* made with *Iron*. The *Cauſe* is, for that *Braſſe* hath, in it ſelfe, a *Sanative Vertue*; And ſo in the very Inſtant helpeth ſomewhat: But *Iron* is *Corroſive*, and not *Sanative*. And therefore it were good, that the Inſtruments which are uſed by *Chirurgians* about *Wounds*, were rather of *Braſſe*, than *Iron*.

Experiment Solitary, touching *Wounds*.

787

Experiment Solitary, touching *Mortification* by *Cold*. 788

IN the *Cold Countries*, when Mens *Noses*, and *Eares* are Mortified, and (as it were) Gangrened with *Cold*, if they come to a Fire, they rot off presently. The *Cause* is, for that the few *Spirits*, that remaine in those *Parts*, are suddenly drawne forth, and so *Putrefaction* is made Compleat. But *Snow* Put upon them, helpeth; For that it preserveth those *Spirits* that remaine, till they can revive; And besides, *Snow* hath in it a Secret *Warmth*: As the *Monke* proved out of the *Text*; *Qui dat Nivem sicut Lanam, Gelu sicut Cineres spargit*. Whereby he did inferre, that *Snow* did warme like *Wooll*, and *Frost* did fret like *Ashes*. *Warme Water* also doth good; Because by little and little it openeth the Pores, without any sudden Working upon the *Spirits*. This *Experiment* may be transferred unto the *Cure* of *Gangrenes*, either Comming of themselves, or induced by too much Applying of *Opiates*: Wherein you must beware of *Dry Heat*, and resort to Things that are *Refrigerant*, with an Inward *Warmth*, and *Vertue* of Cherishing.

Experiment Solitary, touching *Weight*. 789

WEigh *Iron*, and *Aqua Fortis*, severally; Then dissolve the *Iron* in the *Aqua Fortis*: And weigh the *Dissolution*; And you shall finde it to beare as good *Weight*, as the *Bodies* did severally: Notwithstanding a good deale of Wast, by a thick *Vapour*, that issueth during the *Working*: Which sheweth, that the *Opening* of a *Body*, doth increase the *Weight*. This was tried once, or twice, but I know not, whether there were any *Errour*, in the *Triall*.

Experiment Solitary, touching the *Super-Natation* of *Bodies*. 790

TAke of *Aqua-Fortis* two *Ounces*, of *Quick-silver* two *Drachmes*, (For that Charge the *Aqua-Fortis* will beare;) The *Dissolution* will not beare a *Flint*, as big as a *Nutmeg*: Yet (no doubt) the Increasing of the *Weight* of *Water*, will increase his *Power* of *Bearing*; As we see *Broine*, when it is Salt enough, will beare an *Egge*. And I remember well a *Physitian*, that used to give some Minerall *Baths* for the *Gout*, &c. And the *Body* when it was put into the Bath, could not get downe so easily, as in Ordinary *Water*. But it seemeth, the *Weight* of the *Quick-silver*, more than the *Weight* of a *Stone*; doth not compense the *Weight* of a *Stone*, more than the *Weight* of the *Aqua-Fortis*.

Experiment Solitary, touching the *Flying* of *Vnequall Bodies* in the *Aire*. 791

LEt there be a Body of *Vnequall weight*; (As of *Wood* and *Lead*, or *Bone* and *Lead*;) If you throw it from you with the *Light-End* forward, it will turne, and the *Weightier End* will recover to be Forwards; Unlesse the *Body* be Over-long. The *Cause* is, for that the more *Dense Body*, hath a more Violent *Pressure* of the Parts, from the first *Impulsion*; Which is the *Cause*, (though heretofore not found out, as hath bin often said,) of all *Violent Motions*: And when the *Hinder Part* moveth swifter, (for that it lesse endureth *Pressure* of *Parts*,) than the *Forward Part* can make way for it, it must needs be, that the *Body* turne over: For (turned) it can more easily draw forward the *Lighter* Part. *Galilæus* noteth it well; That if an *Open Trough*, wherein *Water* is, be driven faster than the *Water* can

can follow, the *water* gathereth upon an heape, towards the *Hinder End*, where the *Motion* began; Which he supposeth, (holding confidently the *Motion* of the *Earth*,) to be the *Cause* of the *Ebbing* and *Flowing* of the *Ocean*; Because the *Earth* over-runneth the *water*. Which *Theory*, though it be false, yet the first *Experiment* is true. As for the *Inequalitie* of the *Pressure* of *Parts*, it appeareth manifestly in this; That if you take a *Body* of *Stone*, or *Iron*, and another of *Wood*, of the same *Magnitude*, and *Shape*, and throw them with equall Force, you cannot possibly throw the *Wood*, so farre, as the *Stone*, or *Iron*.

Experiment Solitary, touching *water*, that it may be the *Medium* of *Sounds*. 792

IT is certaine, (as it hath beene formerly, in part, touched,) that *Water* may be the *Medium* of *Sounds*. If you dash a *Stone* against a *Stone* in the *Bottome* of the *Water*, it maketh a *Sound*. So a long *Pole* strucke upon *Gravell*, in the *Bottome* of the *Water*, maketh a *Sound*. Nay, if you should thinke that the *Sound* commeth up by the *Pole*, and not by the *Water*, you shall finde that an *Anchor*, let downe by a *Roape*, maketh a *Sound*; And yet the *Roape* is no Solide *Body*, whereby the *Sound* can ascend.

Experiment Solitary, of the *Flight* of the *Spirits* upon *Odious Objects*. 793

ALL *Objects* of the *Senses*, which are very *Offensive*, doe cause the *Spirits* to retire; And upon their *Flight*, the *Parts* are (in some degree) destitute; And so there is induced in them a *Trepidation* and *Horrour*. For *Sounds*, we see that the *Grating* of a *Saw*, or any very *Harsh Noise*, will set the *Teeth* on edge, and make all the *Body* Shiver. For *Tastes*, we see that in the Taking of a *Potion*, or *Pills*, the *Head*, and the *Necke* shake. For *Odious Smells*, the like Effect followeth, which is lesse perceived, because there is a Remedy at hand, by Stopping of the *Nose*: But in *Horses*, that can use no such Helpe, we see the *Smell* of a *Carrion*, especially of a *Dead Horse*, maketh them fly away, and take on, almost as if they were Mad. For *Feeling*, if you come out of the *Sunne*, suddenly, into a *Shade*, there followeth a *Chilnesse* or *Shivering* in all the *Body*. And even in *Sight*, which hath (in effect) no *Odious Object*, Comming into *Sudden Darknesse*, induceth an *Offer* to *Shiver*.

Experiment Solitary, touching the *Super-Reflexion* of *Eccho's*. 794

THere is, in the *City* of *Ticinum*, in *Italy*, a *Church*, that hath Windows only from above: It is in Length an Hundred Feet, in Breadth Twenty Feet, and in Height neare Fifty; Having a *Doore* in the Middest. It reporteth the *Voice*, twelve or thirteene times, if you stand by the Close *End-wall*, over against the *Doore*. The *Eccho* fadeth, and dyeth by little and little, as the *Eccho* at *Pont-charenton* doth. And the *Voice* soundeth, as if it came from above the *Doore*. And if you stand at the *Lower End*, or on either *Side* of the *Doore*, the *Eccho* holdeth; But if you stand in the *Doore*, or in the *Middest* just over against the *Doore*, not. Note that all *Eccho's* sound better against *Old walls*, than *New*; Because they are more *Dry*, and *Hollow*.

Experiment Solitary, touching the *Force* of *Imagination*, *Imitating* that of the *Sense*.

795

THose *Effects*, which are wrought by the *Percussion* of the *Sense*, and by *Things* in *Fact*, are produced likewise, in some degree, by the *Imagination*. Therefore if a Man see another eat *Soure* or *Acide Things*, which set the *Teeth* on edge, this *Object* tainteth the *Imagination*. So that he that seeth the *Thing* done by another, hath his owne *Teeth* also set on edge. So if a Man see another turne swiftly, and long; Or if he looke upon *Wheeles* that turne, Himselfe waxeth *Turne-sicke*. So if a Man be upon an *High Place*, without *Railes*, or good Hold, except he be used to it, he is Ready to Fall: For *Imagining* a *Fall*, it putteth his *Spirits* into the very *Action* of a *Fall*. So Many upon the *Seeing* of others *Bleed*, or *Strangled*, or *Tortured*, Themselves are ready to faint, as if they *Bled*, or were in *Strife*.

Experiment Solitary, touching *Preservation* of *Bodies*.

796

TAke a *Stocke-Gilly-Flower*, and tye it gently upon a Sticke and put them both into a *Stoope Glasse*, full of *Quick-silver*, so that the *Flower* be covered: Then lay a little *Weight* upon the Top of the *Glasse*, that may keepe the Sticke downe; And looke upon them after foure or five dayes; And you shall finde the *Flower* Fresh, and the *Stalke* Harder, and lesse *Flexible*, than it was. If you compare it with another *Flower*, gathered at the same time, it will be the more manifest. This sheweth, that *Bodies* doe preserve excellently in *Quick-silver*; And not preserve onely, but by the *Coldnesse* of the *Quick-silver*, *Indurate*; For the *Freshnesse* of the *Flower* may be meerely *Conservation*; (which is the more to be observed, because the *Quick-silver* presseth the *Flower*;) But the *Stiffenesse* of the *Stalke*, cannot be without *Induration*, from the Cold (as it seemeth,) of the *Quick-silver*.

Experiment Solitary, touching the *Growth*, or *Multiplying* of *Metalls*.

797

IT is reported by some of the *Ancients*, that in *Cyprus*, there is a *Kinde* of *Iron*, that being cut into *Little Peeces*, and put into the Ground, if it be well *Watered*, will increase into *Greater Peeces*. This is certaine, and knowne of Old; That *Lead* will multiply, and Increase; As hath beene seene in *Old Statues* of *Stone*, which have beene put in *Cellars*; The *Feet* of them being bound with *Leaden Bands*; Where (after a time,) there appeared, that the *Lead* did swell; Insomuch as it hanged upon the *Stone* like *Warts*.

Experiment Solitary, touching the *Drowning* of the *more Base Metall* in the *more Precious*.

798

I Call *Drowning* of *Metalls*, when that the *Baser Metall*, is so incorporate with the more *Rich*, as it can by no Meanes be separated againe: which is a kinde of *Version*, though False: As if *Silver* should be inseparably incorporated with *Gold*; Or *Copper*, and *Lead*, with *Silver*. The Ancient *Electrum* had in it a Fifth of *Silver* to the *Gold*; And made a *Compound Metall*, as fit for most uses, as *Gold*; And more Resplendent, and more Qualified in some other Properties; But then that was easily Separated. This to doe priuily, or to make the *Compound* passe for the *Rich Metall* Simple, is an *Adulteration*, or *Counterfeiting*: But if it be done Avowedly, and without Disguizing, it may be a great *Saving* of the

the *Richer Metall*. I remember to have heard of a Man, skilfull in *Metalls*, that a Fifteenth Part of *Silver*, incorporate with *Gold*, will not be Recovered by any *Water* of *Separation*; Except you put a Greater *Quantitie* of *Silver*, to draw to it the Lesse; which (he said) is the last Refuge in *Separations*. But that is a tedious way, which no Man (almost) will thinke on. This would be better enquired; And the *Quantitie* of the Fifteenth turned to a Twentieth; And likewise with some little *Additionall*, that may further the *Intrinsique Incorporation*. Note that *Silver* in *Gold* will be detected by *Weight*, compared with the *Dimension*; But *Lead* in *Silver*, (*Lead* being the *Weightier Metall*,) will not be detected; If you take so much the more *Silver*, as will countervaile the *Over-weight* of the *Lead*.

Gold is the onely *Substance*, which hath nothing in it *Volatile*, and yet melteth without much difficultie. The *Melting* sheweth that it is not Jejune, or Scarce in *Spirit*. So that the *Fixing* of it, is not *Want* of *Spirit* to fly out, but the *Equall Spreading* of the *Tangible Parts*, and the *Close Coacervation* of them: Whereby they have the lesse Appetite, and no Meanes (at all) to issue forth. It were good therefore to try, whether *Glasse Re-moulten* doe leese any *Weight*? For the *Parts* in *Glasse* are evenly Spred; But they are not so Close as in *Gold*; As we see by the Easie Admission of *Light*, *Heat*, and *Cold*; And by the *Smalnesse* of the *Weight*. There be other *Bodies*, *Fixed*, which have little, or no *Spirit*: So as there is nothing to fly out; As we see in the *Stuffe*, whereof *Coppells* are made; Which they put into *Furnaces*; Upon which *Fire* worketh not: So that there are three *Causes* of *Fixation*; The *Even Spreading* both of the *Spirits*, and *Tangible Parts*; The *Closeneſſe* of the *Tangible Parts*; And the *Ieiuneneſſe* or *Extreme Comminution* of *Spirits*: Of which Three, the Two First may be ioyned with a *Nature Liquefiable*; The Last not.

Experiment Solitary, touching *Fixation* of *Bodies*. 799

IT is a Profound *Contemplation* in *Nature*, to consider of the *Emptineſſe*, (as we may call it,) or *Insatisfaction* of severall *Bodies*; And of their *Appetite* to take in Others. *Aire* taketh in *Lights*, and *Sounds*, and *Smells*, and *Vapours*; And it is most manifest, that it doth it, with a kinde of Thirst, as not satisfied with his owne former Consistence; For else it would never receive them in so suddenly, and easily. *Water*, and all *Liquours*, doe hastily receive *Dry* and more *Terrestriall Bodies*, Proportionable: And *Dry Bodies*, on the other side, drinke in *Waters*, and *Liquours*: So that, (as it was well said, by one of the *Ancients*, of *Earthy* and *Watry Substances*,) *One is a Glue to another*. *Parchment*, *Skins*, *Cloth*, &c. drinke in *Liquours*, though themselves be *Entire Bodies*, and not *Comminuted*, as *Sand*, and *Ashes*; Nor apparently Porous: *Metalls* themselves doe receive in readily *Strong-Waters*; And *Strong-Waters* likewise doe readily pierce into *Metalls*, and *Stones*: And that *Strong-Water* will touch upon *Gold*, that will not touch upon *Silver*; And *è converso*. And *Gold*, which

Experiment Solitary, touching the *Restlesse Nature* of Things in *Themselves*, and their *Desire* to *Change*. 800

which seemeth by the *Weight*, to be the Closest, and most Solide *Body*, doth greedily drinke in *Quick-Silver*. And it seemeth, that this *Reception* of other *Bodies*, is not Violent: For it is (many times) Reciprocall, and as it were with Consent. Of the *Cause* of this, and to what *Axiome* it may be referred, consider attentively; For as for the Pretty Assertion, that *Matter* is like a *Common Strumpet*, that desireth all *Formes*, it is but a *Wandring Notion*. Onely *Flame* doth not content it selfe to take in any other *Body*; But either, to overcome and turne another *Body* into it Selfe, as by Victory; Or it Selfe to dye, and goe out.

NATU-

NATVRALL HISTORIE.

IX. Century.

IT is certaine, that all *Bodies* whatsoever, though they have no *Sense*, yet they have *Perception*: For when one *Body* is applied to another, there is a Kinde of *Election*, to embrace that which is Agreeable, and to exclude or expell that which is Ingrate: And whether the *Body* be *Alterant*, or *Altered*, evermore a *Perception* precedeth *Operation*: For else all *Bodies* would be alike One to Another. And sometimes this *Perception*, in some Kinde of *Bodies*, is farre more Subtill than the *Sense*; So that the *Sense* is but a dull Thing in Comparison of it: Wee see a *Weather-Glasse*, will finde the least difference of the *Weather*, in *Heat*, or *Cold*, when Men finde it not. And this *Perception* also, is sometimes at *Distance*, as well as upon the *Touch*; As when the *Load-Stone* draweth *Iron*; or *Flame*

Experiments in Consort, touching *Perception* in *Bodies Insensible*, tending to *Naturall Divination*, or *Subtill Trials*.

Flame fireth *Naphtha* of *Babylon*, a great distance off. It is therefore a *Subject* of a very *Noble Enquiry*, to enquire of the more *Subtill Perceptions*; For it is another *Key* to open *Nature*, as well as the *Sense*; And sometimes Better. And besides, it is a Principall *Meanes* of *Naturall Divination*; For that which in these *Perceptions* appeareth early, in the great *Effects* commeth long after. It is true also, that it serveth to *discover* that which is *Hid*, as well as to *foretell* that which is to *Come*; As it is in many *Subtill Trialls*; As to trie whether *Seeds* be old, or new, the *Sense* cannot informe: But if you boile them in *Water*, the New *Seeds* will sprout sooner: And so of *Water*, the *Taste* will not discover the best *Water*; But the *Speedy Consuming* of it, and many other *Meanes*, which we have heretofore set downe, will discover it. So in all *Physiognomy*, the *Lineaments* of the *Body* will discover those *Naturall Inclinations* of the *Minde*, which *Dissimulation* will conceale, or *Discipline* will suppresse. Wee shall therefore now handle onely, those two *Perceptions*, which pertaine to *Naturall Divination*, and *Discovery*: Leaving the Handling of *Perception* in other Things, to be disposed Elsewhere. Now it is true, that *Divination* is attained by other *Meanes*; As if you know the *Causes*; If you know the *Concomitants*; you may judge of the *Effect* to follow: And the like may be said of *Discovery*; But we tie our Selves here, to that *Divination* and *Discovery* chiefly, which is Caused by an *Early*, or *Subtill Perception*.

The *Aptnesse* or *Propension* of *Aire*, or *Water*, to Corrupt or Putrifie, (no doubt,) is to be found before it breake forth into manifest *Effects* of *Diseases*, *Blasting*, or the like. Wee will therefore set downe some *Prognosticks* of *Pestilentiall* and *Vnwholsome Yeares*.

801 The *Wind* blowing much from the *South*, without *Raine*; And *Wormes* in the *Oake-Apple*; have beene spoken of before. Also the *Plenty* of *Frogs*, *Grashoppers*, *Flies*, and the like *Creatures* bred of *Putrefaction*, doth portend *Pestilentiall Yeares*.

802 *Great*, and *Early Heats* in the *Spring*, (and namely in *May*,) without *Winds*, portend the same; And generally so doe *Yeares* with little *Wind*, or *Thunder*.

Great

Great Droughts in *Summer*, lasting till towards the *End* of *August*, and some *Gentle Showers* upon them; And then some *Drie Weather* againe; Doe portend a *Pestilent Summer*, the *Yeare* following: For about the *End* of *August*, all the *Sweetnesse* of the *Earth*, which goeth into *Plants*, and *Trees*, is exhaled; (And much more if the *August* be dry;) So that nothing then can breathe forth of the *Earth*, but a grosse *Vapour*, which is apt to Corrupt the *Aire*: And that *Vapour*, by the first *Showres*, if they be *Gentle*, is released, and commeth forth abundantly. Therefore they that come abroad soone after those *Showres*, are commonly taken with *Sickenesse*: And in *Affricke*, no Body will stirre out of doores, after the first *Showres*. But if the *Showres* come vehemently, then they rather wash and fill the *Earth*, than give it leave to breathe forth presently. But if *Drie Weather* come againe, then it fixeth and continueth the *Corruption* of the *Aire*, upon the first *Showres* begun; And maketh it of ill *Influence*, even to the Next *Summer*; Except a very *Frostie Winter* discharge it; Which seldome succeedeth such *Droughts*. 803

The *Lesser Infections*, of the *Small Pockes*, *Purple Fevers*, *Agues*, in the *Summer Precedent*, and hovering all *Winter*, doe portend a great *Pestilence* in the *Summer* following; For *Putrefaction* doth not rise to his height at once. 804

It were good to lay a *Peece* of *Raw Flesh*, or *Fish*, in the *Open Aire*; And if it Putrefie quickly, it is a *Signe* of a *Disposition* in the *Aire* to *Putrefaction*. And becausse you cannot be informed, whether the *Putrefaction* be quicke or late, except you compare this *Experiment* with the like *Experiment* in another *Yeare*, it were not amisse, in the same *Yeare*, and at the same *Time*, to lay one *Peece* of *Flesh*, or *Fish*, in the *Open Aire*, and another of the same Kinde and Bignesse, within *Doores*: For I Judge, that if a generall *Disposition* be in the *Aire* to Putrefie, the *Flesh*, or *Fish*, will sooner Putrefie abroad, where the *Aire* hath more power, than in the *House*, where it hath lesse, being many wayes corrected. And this *Experiment* would be made about the *End* of *March*: For that *Season* is likest to discover, what the *Winter* hath done; And what the *Summer* following will doe upon the *Aire*. And becausse the *Aire* (no doubt) receiveth great *Tincture*, and *Infusion* from the *Earth*; It were good to trie that *Exposing* of *Flesh*, or *Fish*, both upon a *Stake* of *Wood*, some height above the *Earth*, and upon the *Flat* of the *Earth*. 805

Take *May-Dew*, and see whether it putrifie quickly, or no? For that likewise may disclose the *Qualitie* of the *Aire*, and *Vapour* of the *Earth*, more or lesse *Corrupted*. 806

A *Drie March*, and a *Drie May*, portend a *Wholesome Summer*, if there be a *Showring Aprill* betweene: But otherwise, it is a *Signe* of a *Pestilentiall Yeare*. 807

As the *Discoverie* of the *Disposition* of the *Aire*, is good for the *Prognosticks* of *Wholesome*, and *Vnwholesome Yeares*; So it is of much more use, for the *Choice* of *Places* to dwell in: At the least, for *Lodges*, and *Retiring Places* for *Health*; (For *Mansion Houses* respect *Provisions*, as well 808

as

as *Health*;) Wherein the *Experiments* above mentioned may serve.

809 But for the *Choice* of *Places*, or *Seats*, it is good to make Triall, not only of *Aptneſſe* of *Aire* to corrupt, but alſo of the *Moiſture* and *Drineſſe* of the *Aire*; and the *Temper* of it, in *Heat*, or *Cold*; For that may concerne *Health* diverſly. We ſee that there be ſome *Houſes*, wherein *Sweet Meats* will relent, and *Baked Meats* will mould, more than in others; And *Wainſcoats* will alſo ſweat more; ſo that they will almoſt run with *Water*: All which, (no doubt,) are cauſed chiefly by the *Moiſtneſſe* of the *Aire*, in thoſe *Seats*. But becauſe it is better to know it, before a *Man* buildeth his *Houſe*, than to finde it after, take the *Experiments* following.

810 Lay *Wooll*, or a *Sponge*, or *Bread*, in the *Place* you would trie, comparing it with ſome other *Places*; And ſee whether it doth not moiſten, and make the *Wooll*, or *Sponge*, &c. more Ponderous, than the other? And if it doe, you may judge of that Place, as Situate in a *Groſſe*, and *Moiſt Aire*.

811 Becauſe it is certaine, that in ſome *Places*, either by the *Nature* of the *Earth*, or by the *Situation* of *Woods*, and *Hills*, the *Aire* is more Unequall, than in Others; And *Inequalitie* of *Aire* is ever an Enemy to *Health*; It were good to take two *Weather-Glaſſes*, Matches in all things, and to ſet them, for the ſame Houres of One day, in ſeverall *Places*, where no *Shade* is, nor *Encloſures*: And to marke, when you ſet them, how farre the *Water* commeth; And to compare them, when you come againe, how the *water* ſtandeth then: And if you finde them *Vnequall*, you may be ſure that the *Place* where the *Water* is loweſt, is in the *Warmer Aire*, and the other in the *Colder*. And the greater the *Inequalitie* be, of the *Aſcent*, or *Deſcent* of the *Water*, the greater is the *Inequalitie* of the *Temper* of the *Aire*.

812 The *Predictions* likewiſe of *Cold* and *Long Winters*, and *Hot* and *Drie Summers*, are good to be knowne; As well for the *Diſcoverie* of the *Cauſes*, as for divers *Proviſions*. That of *Plenty* of *Hawes*, and *Heps*, and *Briar-Berries*, hath beene ſpoken of before. If *Wainſcoat*, or *Stone*, that have uſed to Sweat, be more drie, in the Beginning of *Winter*; Or the *Drops* of the *Eaues* of *Houſes* come more ſlowly downe, than they uſe; it portendeth a *Hard* and *Froſtie Winter*. The *Cauſe* is, for that it ſheweth an *Inclination* of the *Aire*, to *Drie weather*; which in *Winter* is ever joyned with *Froſt*.

813 Generally, a *Moiſt* and *Coole Summer*, portendeth a *Hard Winter*. The *Cauſe* is, for that the *Vapours* of the *Earth*, are not diſſipated in the *Summer*, by the *Sunne*; And ſo they rebound upon the *Winter*.

814 A *Hot* and *Drie Summer*, and *Autumne*, and eſpecially if the *Heat* and *Drought* extend farre into *September*, portendeth an Open Beginning of *Winter*; And *Colds* to ſucceed, toward the latter Part of the *Winter*, and the Beginning of the *Spring*: For till then, the former *Heat* and *Drought* beare the Sway; And the *Vapours* are not ſufficiently Multiplied.

815 An *Open* and *Warme Winter* portendeth a *Hot* and *Drie Summer*: For the *Vapours* diſperſe into the *Winter Showres*; Whereas *Cold* and *Froſt* keepeth

keepeth them in, and transporteth them into the late *Spring*, and *Summer* following.

Birds that use to change *Countries*, at certaine *Seasons*, if they come Earlier, doe shew the *Temperature* of *Weather*, according to that *Country* whence they came: As the *winter-Birds*, (namely, *Woodcocks*, *Feldefares*, &c.) if they come earlier, and out of the *Northerne Countries*, with us shew *Cold Winters*. And if it be in the same *Country*, then they shew a *Temperature* of *Season*, like unto that *Season* in which they come: As *Swallowes*, *Bats*, *Cuckoos*, &c. that come towards *Summer*, if they come early, shew a *Hot Summer* to follow. 816

The *Prognosticks*, more Immediate, of *Weather* to follow soone after, are more Certaine than those of *Seasons*. The *Resounding* of the *Sea* upon the *Shoare*; And the *Murmur* of *Winds* in the *Woods*, without apparent *Wind*; shew *Wind* to follow: For such *Winds*, breathing chiefly out of the *Earth*, are not at the first perceived, except they be pent, by *Water*, or *Wood*. And therefore a *Murmur* out of *Caves* likewise portendeth as much. 817

The *Vpper Regions* of the *Aire*, perceive the *Collection* of the *Matter* of *Tempest*, and *Winds*, before the *Aire* here below: And therefore the *Obscuring* of the *Smaller Starres* is a *Signe* of *Tempests* following. And of this kinde you shall finde a Number of *Instances* in our *Inquisition De Ventis*. 818

Great Mountaines have a *Perception* of the *Disposition* of the *Aire* to *Tempests*, sooner than the *Valley's* or *Plaines* below: And therefore they say in *Wales*, when certaine *Hills* have their *Night-Caps* on, they meane Mischiefe. The *Cause* is, for that *Tempests*, which are for the most part bred above, in the *Middle Region*, (as they call it,) are soonest perceived to collect in the *Places* next it. 819

The *Aire*, and *Fire*, have *Subtill Perceptions* of *Wind Rising*, before *Men* finde it. We see the *Trembling* of a *Candle* will discover a *Wind* that otherwise we doe not feele; And the *Flexuous Burning* of *Flames* doth shew the *Aire* beginneth to be unquiet; And so doe *Coales* of *Fire* by Casting off the *Ashes* more than they use. The *Cause* is, for that no *Wind*, at the first, till it hath strooke and driven the *Aire*, is Apparent to the *Sense*: But *Flame* is easier to move, than *Aire*: And for the *Ashes*, it is no marvell, though *Wind* unperceived shake them off; For wee usually trie, which way the *Wind* bloweth, by casting up *Grasse*, or *Chaffe*, or such light Things, into the *Aire*. 820

When *Wind* expireth from under the *Sea*; As it causeth some *Resounding* of the *Water*, (whereof wee spake before,) so it causeth some *Light Motions* of *Bubbles*, and *White Circles* of *Froth*. The *Cause* is, for that the *Wind* cannot be perceived by the *Sense*, untill there be an *Eruption* of a great *Quantitie*, from under the *Water*; And so it getteth into a *Body*: Whereas in the first *Putting up* it commeth in little Portions. 821

Wee spake of the *Ashes*, that *Coales* cast off; And of *Grasse*, and *Chaffe* carried by the *Wind*; So any *Light Thing* that moveth, when we finde no 822

Wind, sheweth a *Wind* at hand: As when *Feathers*, or *Downe* of *Thistles*, fly to and fro in the *Aire*.

For *Prognosticks* of *Weather* from *Living Creatures*, it is to be noted; That *Creatures* that live in the *Open Aire*, (*Sub Dio*,) must needs have a Quicker *Impression* from the *Aire*, than *Men* that live most within *Doores*; And especially *Birds*, who live in the *Aire*, freest, and Cleerest; And are aptest by their *Voice* to tell Tales, what they finde; And likewise by the *Motion* of their *Flight* to expresse the same.

823 *Water-Fowles*, (as *Sea-Gulls*, *More-Hens*, &c.) when they flocke and fly together, from the *Sea* towards the *Shores*; And contrariwise, *Land-Birds*, (as *Crowes*, *Swallowes*, &c.) when they fly from the *Land* to the *Waters*, and beat the *Waters* with their *Wings*; doe fore-shew *Raine*, and *Wind*. The *Cause* is, *Pleasure*, that both Kindes take in the *Moistnesse*, and *Densitie* of the *Aire*: And so desire to be in *Motion*, and upon the *wing*, whither soever they would otherwise goe: For it is no Marvell, that *Water-Fowle* doe joy most in that *Aire*, which is likest *Water*; And *Land-Birds*, also, (many of them,) delight in *Bathing*, and *Moist Aire*. For the same Reason also, many *Birds* doe proine their *Feathers*; And *Geese* doe gaggle; And *Crowes* seeme to call upon *Raine*: All which is but the Comfort they seeme to receive in the *Relenting* of the *Aire*.

824 The *Heron*, when she soareth high, (so as sometimes she is seene to passe over a *Cloud*,) sheweth *Winds*: But *Kites* flying aloft, shew *Faire* and *Dry Weather*. The *Cause* may be, for that they both mount most into the *Aire*, of that Temper, wherein they delight: And the *Heron*, being a *Water-Fowle*, taketh pleasure in the *Aire*, that is Condensed: And besides, being but Heavy of *Wing*, needeth the Helpe of the *Grosser Aire*. But the *Kite* affecteth not so much the *Grossenesse* of the *Aire*, as the *Cold* and *Freshnesse* thereof; For being a *Bird* of *Prey*, and therefore *Hot*, she delighteth in the *Fresh Aire*; And (many times) flyeth against the *Wind*; As *Trouts*, and *Salmons* swimme against the Streame. And yet it is true also, that all *Birds* finde an Ease in the depth of the *Aire*; As *Swimmers* doe in a Deepe *Water*. And therefore when they are aloft, they can uphold themselves with their *Wings Spred*, scarce moving them.

825 *Fishes*, when they play towards the *Top* of the *Water*, doe commonly foretell *Raine*. The *Cause* is, for that a *Fish* hating the *Dry*, will not approach the *Aire*, till it groweth *Moist*; And when it is *Dry*, will fly it, and *Swimme* Lower.

826 *Beasts* doe take Comfort, (generally,) in a *Moist Aire*; And it maketh them eat their *Meat* better: And therefore *Sheepe* will get up betimes in the Morning, to feed, against *Raine*: And *Cattell*, and *Deere*, and *Conneyes*, will feed hard before *Raine*: And a *Heifer*, will put up his *Nose*, and snuffe in the *Aire*, against *Raine*.

The

827 The *Trifoile*, againſt *Raine*, ſwelleth in the *Stalke*; and ſo ſtandeth more upright; For by *Wet*, *Stalkes* doe erect, and *Leaves* bow downe. There is a Small Red *Flower* in the *Stubble-Fields*, which Countrey People call the *Wincopipe*; Which if it open in the *Morning*, you may be ſure of a faire *Day* to follow.

828 Even in *Men*, *Aches*, and *Hurts*, and *Cornes*, doe engrieve, either towards *Raine*, or towards *Froſt*: For the One maketh the *Humours* more to Abound; And the Other maketh them Sharper. So we ſee both *Extremes* bring the *Gout*.

829 *Wormes*, *Vermine*, &c. doe fore-ſhew (likewiſe) *Raine*: For *Earth-wormes* will come forth, and *Moules* will caſt up more, and *Fleas* bite more, againſt *Raine*.

830 *Solide Bodies* likewiſe fore-ſhew *Raine*. As *Stones*, and *Wainſcot*, when they *Sweat*: And *Boxes*, and *Peggs* of *Wood*, when they Draw, and *Wind hard*; Though the Former be but from an Outward Cauſe; For that the *Stone*, or *Wainſcot*, turneth and beateth backe the *Aire* againſt it ſelfe; But the latter is an *Inward Swelling* of the *Body* of the *Wood* it ſelfe.

Experiment Solitary, touching the *Nature* of *Appetite* in the *Stomach*.

831 *APpetite* is moved chiefly by Things that are *Cold*, and *Dry*; The *Cauſe* is, for that *Cold* is a Kinde of *Indigence* of *Nature*, and calleth upon Supply; And ſo is *Drineſſe*: And therefore all *Soure Things*, (as *Vinegar*, *Iuyce* of *Limons*, *Oyle* of *Vitrioll*, &c.) provoke *Appetite*. And the *Diſeaſe*, which they call *Appetitus Caninus*, conſiſteth in the *Matter* of an *Acide* and *Glaſſy Flegme*, in the *Mouth* of the *Stomach*. *Appetite* is alſo moved by *Soure Things*; For that *Soure Things*, induce a *Contraction* in the *Nerves*, placed in the *Mouth* of the *Stomach*; Which is a great *Cauſe* of *Appetite*. As for the *Cauſe*, why *Onions*, and *Salt*, and *Pepper*, in Baked Meats, move *Appetite*, it is by *Vellication* of thoſe *Nerves*; For *Motion* whetteth. As for *Worme-wood*, *Olives*, *Capers*, and others of that kinde, which participate of *Bitterneſſe*, they move *Appetite* by *Abſterſion*. So as there be foure Principall *Cauſes* of *Appetite*; The *Refrigeration* of the *Stomach*, joyned with ſome *Drineſſe*; *Contraction*; *Vellication*; And *Abſterſion*: Beſides *Hunger*, which is an *Emptineſſe*: And yet *Over-Faſting* doth (many times) cauſe the *Appetite* to ceaſe; For that *Want* of *Meat* maketh the *Stomach* draw *Humours*; And ſuch *Humours* as are Light, and Cholericke, which quench *Appetite* moſt.

Experiment Solitary, touching *Sweetneſſe* of *Odour* from the *Rainbow*.

832 IT hath beene obſerved by the *Ancients*, that where a *Raine-Bow* ſeemeth to hang over, or to touch, there breatheth forth a *Sweet Smell*. The *Cauſe* is, for that this happeneth but in certaine Matters, which have in themſelves ſome *Sweetneſſe*; Which the *Gentle Dew* of the *Raine-Bow* doth draw forth: And the like doe *Soft Showers*; For they alſo make the *Ground* Sweet: But none are ſo delicate as the *Dew* of the *Rain-Bow*, where it falleth. It may be alſo, that the *Water* it ſelfe hath ſome *Sweetneſſe*: For the *Raine-Bow* conſiſteth of a *Glomeration* of *Small Drops*, which cannot poſſibly fall, but from the *Aire*, that is very *Low*: And

therefore may hold the verie *Sweetneſſe* of the *Herbs*, and *Flowers*, as a *Diſtilled Water*: For *Raine*, and other *Dew*, that fall from high, cannot preſerve the Smell, being diſſipated in the drawing up: Neither doe we know, whether ſome *Water* it ſelfe, may not have ſome degree of *Sweetneſſe*. It is true, that wee finde it ſenſibly in no *Poole*, *River*, nor *Fountaine*; But good *Earth*, newly turned up, hath a *Freſhneſſe*, and good *Sent*; Which *water*, if it be not too *Equall*, (For *Equall Objects* never move the *Senſe*,) may alſo have. Certaine it is, that *Bay-Salt*, which is but a kinde of *Water Congealed*, will ſometimes ſmell like *Violets*.

Experiment Solitary, touching *Sweet Smells*. 833

TO *Sweet Smells Heat* is requiſite, to Concoct the *Matter*; And ſome *Moiſture* to Spread the *Breath* of them. For *Heat*, we ſee that *Woods*, and *Spices*, are more *Odorate* in the *Hot Countries*, than in the *Cold*: For *Moiſture*, we ſee that Things too much Dried, loſe their *Sweetneſſe*: And *Flowers* growing, ſmell better in a *Morning*, or *Evening*, than at *Noone*. Some *Sweet Smells* are deſtroyed by Approach to the *Fire*; As *Violets*, *Wall-Flowers*, *Gilly-Flowers*, *Pincks*; And generally all *Flowers* that have *Coole* and *Delicate Spirits*. Some continue both on the *Fire*, & from the *Fire*, As *Roſe-Water*, &c. Some doe ſcarce come forth, or at leaſt not ſo pleaſantly, as by meanes of the *Fire*; as *Iuniper*, *Sweet Gums*, &c. And all *Smells*, that are Encloſed in a *Faſt Body*: But (generally) thoſe *Smells* are the moſt Gratefull, where the *Degree* of *Heat* is Small; Or where the *Strength* of the *Smell* is allayed; For theſe *Things* doe rather wooe the *Senſe*, than Satiate it. And therefore the *Smell* of *Violets*, and *Roſes* exceedeth in *Sweetneſſe* that of *Spices*, and *Gummes*; And the Strongeſt Sort of *Smells*, are beſt in a weſt, a farre off.

Experiment Solitary, touching the *Corporeall Subſtance* of *Smells*. 834

IT is certaine, that no *Smell* iſſueth, but with *Emiſſion* of ſome *Corporeall Subſtance*; Not as it is in *Light*, and *Colours*, and in *Sounds*. For we ſee plainly, that *Smell* doth ſpread nothing that diſtance, that the other doe. It is true, that ſome *Woods* of *Orenges*, and *Heathes* of *Roſe-Mary*, will Smell a great way into the *Sea*, perhaps twentie Miles; But what is that, ſince a *Peale* of *Ordnance* will doe as much, which moveth in a ſmall compaſſe? Whereas thoſe *Woods*, and *Heathes*, are of Vaſt Spaces: Beſides wee ſee that *Smells* doe adhere to *Hard Bodies*; As in *Perfuming* of *Gloves*, &c. which ſheweth them *Corporeall*; And doe Laſt a great while, which *Sounds*, and *Light* doe not.

Experiment Solitary, touching *Fetide* and *Fragrant Odours*. 835

THe *Excrements* of moſt *Creatures* Smell ill; Chiefly to the ſame *Creature* that voideth them: For we ſee, beſides that of *Man*, that *Pigeons*, and *Horſes* thrive beſt, if their *Houſes*, and *Stables* be kept Sweet; And ſo of *Cage-Birds*: And the *Cat* burieth that which ſhee voideth: And it holdeth chiefly in thoſe *Beaſts*, which feed upon *Fleſh*. *Dogs* (almoſt) onely of *Beaſts*, delight in *Fetide Odours*; Which ſheweth there is ſomewhat in their *Senſe* of *Smell*, differing from the *Smells* of other *Beaſts*. But the *Cauſe*, why *Excrements* ſmell ill, is manifeſt; For that the

Body

Body it ſelfe rejecteth them; Much more the *Spirits:* And we ſee, that thoſe *Excrements*, that are of the *Firſt Digeſtion*, Smell the worſt; As the *Excrements* from the *Belly:* Thoſe that are from the *Second Digeſtion*, leſſe ill; As *Vrine*; And thoſe that are from the *Third*, yet leſſe; For *Sweat* is not ſo bad, as the other two; Eſpecially of ſome *Perſons*, that are full of *Heat*. Likewiſe moſt *Putrefactions* are of an *Odious Smell:* For they ſmell either *Fetide*, or *Mouldy*. The *Cauſe* may be, for that *Putrefaction* doth bring forth ſuch a *Conſiſtence*, as is moſt Contrarie to the *Conſiſtence* of the *Body*, whilſt it is Sound: For it is a meere diſſolution of that *Forme*. Beſides, there is another Reaſon which is Profound: And it is, that the *Objects* that pleaſe any of the *Senſes*, have (all) ſome *Equalitie*, and (as it were) *Order*, in their *Compoſition:* But where thoſe are wanting, the *Object* is ever Ingrate. So *Mixture* of many *Diſagreeing Colours* is ever unpleaſant to the *Eye: Mixture* of *Diſcordant Sounds* is unpleaſant to the *Eare: Mixture*, or *Hotch-Potch* of many *Taſtes*, is unpleaſant to the *Taſte: Harſhneſſe* and *Ruggedneſſe* of *Bodies*, is unpleaſant to the *Touch:* Now it is certaine, that all *Putrefaction*, being a *Diſſolution* of the firſt *Forme*, is a meere *Confuſion*, and *Vnformed Mixture* of the *Part*. Nevertheleſſe, it is ſtrange, and ſeemeth to Croſſe the former *Obſervation*, that ſome *Putrefactions* and *Excrements* doe yeeld *Excellent Odours*; As *Civet*, and *Muske*; And as ſome thinke *Amber-Greece:* For divers take it, (though unprobably,) to come from the *Sperme* of *Fiſh:* And the *Moſſe*, we ſpake of from *Apple-Trees*, is little better than an *Excretion*. The Reaſon may be, for that there paſſeth in the *Excrements*, and remaineth in the *Putrefactions*, ſome good *Spirits*; eſpecially where they proceed from *Creatures*, that are verie *Hot*. But it may be alſo joyned with a further *Cauſe*, which is more Subtill; And it is, that the *Senſes* love not to be Overpleaſed; But to have a *Commixture* of ſomewhat that is in it ſelfe Ingrate. Certainly, we ſee how *Diſcords* in *Muſicke*, falling upon *Concords*, make the *Sweeteſt Straines:* And we ſee againe, what Strange *Taſtes* delight the *Taſte*; As *Red-Herrings*, *Caveary*, *Parmizan*, &c. And it may be, the ſame holdeth in *Smells*. For thoſe kinde of *Smells*, that we have mentioned, are all Strong, and doe Pull and Vellicate the *Senſe*. And wee finde alſo, that *Places* where Men *Vrine*, commonly have ſome *Smell* of *Violets:* And *Vrine*, if one hath eaten *Nutmeg*, hath ſo too.

The Sloathfull, Generall, and Indefinite *Contemplations*, and *Notions*, of the *Elements*, and their *Conjugations*; Of the *Influences* of Heaven; Of *Heat*, *Cold*, *Moiſture*, *Drought*, *Qualities Active*, *Paſſive*; And the like; have ſwallowed up the true *Paſſages*, and *Proceſſes*, and *Affects*, & *Conſiſtences* of *Matter*, and *Naturall Bodies*. Therefore they are to be ſet aſide, being

but *Notionall*, and *ill Limited*; And Definite *Axiomes* are to be drawne out of *Measured Instances*: And so Assent to be made to the more *Generall Axiomes*, by *Scale*. And of these Kindes of *Processes* of *Natures*, and *Characters* of *Matter*, we will now set downe some *Instances*.

Experiment Solitary, touching the *Causes* of *Putrefaction*. 836

ALL *Putrefactions* come chiefly from the *Inward Spirits* of the *Body*; And partly also from the *Ambient Body*, be it *Aire*, *Liquour*, or whatsoever else. And this last, by two *Meanes*: Either by *Ingresse* of the *Substance* of the *Ambient Bodie*, into the *Body Putrified*; Or by *Excitation* and *Sollicitation* of the *Body Putrified*, and the *Parts* thereof, by the *Body Ambient*. As for the Received Opinion, that *Putrefaction* is caused, either by *Cold*, or *Peregrine* and *Preternaturall Heat*, it is but Nugation: For *Cold* in *Things Inanimate*, is the greatest Enemie that is, to *Putrefaction*; though it extinguisheth *Vivification*, which ever consisteth in *Spirits Attenuate*, which the *Cold* doth congeale, and coagulate. And as for the *Peregrine Heat*, it is thus farre true; That if the *Proportion* of the *Adventine Heat*, be greatly Predominant, to the *Naturall Heat*, and *Spirits* of the *Body*, it tendeth to *Dissolution*, or Notable *Alteration*. But this is wrought by *Emission*, or *Suppression*, or *Suffocation*, of the *Native Spirits*; And also by the *Disordination*, and *Discomposture* of the *Tangible Parts*; And other *Passages* of *Nature*; And not by a *Conflict* of *Heats*.

Experiment Solitary, touching *Bodies Vnperfectly Mixt*. 837

IN *Versions*, or *Maine Alterations* of *Bodies*, there is a *Medium* betweene the *Body*, as it is at first, and the *Body Resulting*; which *Medium* is *Corpus imperfectè Mistum*, and is Transitorie, and not durable; As *Mists*, *Smoakes*, *Vapours*, *Chylus* in the *Stomach*, *Living Creatures* in the first *Vivification*: And the *Middle Action*, which produceth such *Imperfect Bodies*, is fitly called, (by some of the *Ancients*,) *Inquination*, or *Inconcoction*, which is a Kinde of *Putrefaction*; For the *Parts* are in *Confusion*, till they settle, one way, or other.

Experiment Solitary, touching *Concoction* and *Crudities*. 838

THE word *Concoction*, or *Digestion*, is chiefly taken into use from *Living Creatures*, & their *Organs*; And from thence extended to *Liquours*, and *Fruits*, &c. Therefore they speake of *Meat Concocted*; *Vrine* and *Excrements Concocted*; And the *Foure Disgestions*, (In the *Stomach*; In the *Liver*; In the *Arteries* and *Nerves*; And in the *Severall Parts* of the *Bodie*;) are likewise called *Concoctions*: And they are all made to be the Workes of *Heat*: All which *Notions* are but ignorant Catches of a few Things, which are most Obvious to *Mens Observations*. The Constantest *Notion* of *Concoction* is, that it should signifie the *Degrees* of *Alteration*, of one *Body* into another, from *Crudity* to *Perfect Concoction*; Which is the *Vltimitie* of that *Action*, or *Processe*: And while the *Body* to be *Converted* and *Altered*, is too strong for the *Efficient*, that should *Convert*, or *Alter* it, (whereby it resisteth and holdeth fast in some degree the first

Forme,

Forme, or *Consistence*,) it is (all that while,) *Crude*, and *Inconcoct*; And the *Processe* is to be called *Cruditie* and *Inconcoction*. It is true, that *Concoction* is, in great part, the *Worke* of *Heat*; But not the *Worke* of *Heat* alone: For all Things, that further the *Conversion*, or *Alteration*, (as *Rest*, *Mixture* of a *Body* already *Concocted*, &c.) are also *Meanes* to *Concoction*. And there are of *Concoction* two *Periods*; The one *Assimilation*, or *Absolute Conversion* and *Subaction*; The other *Maturation*: whereof the Former is most conspicuous in the *Bodies* of *Living Creatures*; In which there is an *Absolute Conversion*, and *Assimilation* of the *Nourishment* into the *Body*: And likewise in the *Bodies* of *Plants*: And againe in *Metalls*, where there is a full *Transmutation*. The other, (which is *Maturation*,) is seene in *Liquours*, and *Fruits*; wherein there is not desired, nor pretended, an utter *Conversion*, but onely an *Alteration* to that *Forme*, which is most sought, for *Mans* use; As in *Clarifying* of *Drinkes*; *Ripening* of *Fruits*, &c. But note, that there be two Kindes of *Absolute Conversions*; The one is, when a *Body* is converted into another *Body*, which was before; As when *Nourishment* is turned into *Flesh*; That is it which wee call *Assimilation*. The other is, when the *Conversion* is into a *Bodie* meerely New, and which was not before; As if *Silver* should be turned to *Gold*; or *Iron* to *Copper*: And this *Conversion* is better called, for distinctions sake, *Transmutation*.

Experiment Solitary, touching *Alterations*, which may be called *Majors*.

839

THere are also divers other *Great Alterations* of *Matter*, and *Bodies*, besides those that tend to *Concoction*, and *Maturation*; For whatsoever doth so alter a *Body*, as it returneth not againe to that it was, may be called *Alteratio Major*: As when *Meat* is Boyled, or Rosted, or Fried, &c. Or when *Bread* and *Meat* are Baked; Or when *Cheese* is made of Curds, or *Butter* of *Creame*, or *Coales* of wood, or *Bricks* of Earth; And a Number of others. But to apply *Notions Philosophicall* to *Plebeian Termes*; Or to say, where the *Notions* cannot fitly be reconciled, that there wanteth a *Terme*, or *Nomenclature* for it; (as the *Ancients* used;) They be but Shifts of *Ignorance*; For *Knowledge* will be ever a *Wandring* and *Indigested Thing*, if it be but a *Commixture* of a few *Notions*, that are at hand and occurre, and not excited from sufficient Number of Instances, and those well collated.

The *Consistences* of *Bodies* are verie divers: *Dense*, *Rare*, *Tangible*, *Pneumaticall*; *Volatile*, *Fixed*; *Determinate*, *Not Determinate*, *Hard*, *Soft*; *Cleaving*, Not *Cleaving*; *Congealeable*, *Not Congealeable*; *Liquefiable*, Not *Liquefiable*; *Fragile*, *Tough*; *Flexible*, *Inflexible*; *Tractile*, or to be drawen forth in length, *Intractile*; *Porous*, *Solide*; *Equall*, and *Smooth*, *Vnequall*; *Venous*, and *Fibrous*,

brous, and with *Graines*, *Entire*; And divers Others; All which to referre to *Heat*, and *Cold*; and *Moisture*, & *Drought*, is a Compendious and Inutile *Speculation*. But of these see principally our *Abecedarium Naturæ*; And otherwise *Sparsim* in this our *Sylva Sylvarum*: Nevertheless in some good part, We shall handle divers of them now presently.

Experiment Solitary, touching *Bodies Liquefiable*, and *not Liquefiable*.

840

Liquefiable, and *Not Liquefiable*, proceed from these *Causes*: *Liquefaction* is ever caused by the *Detention* of the *Spirits*, which play within the *Body*, and Open it. Therefore such *Bodies*, as are more *Turgide* of *Spirit*; Or that have their *Spirits* more *Straitly Imprisoned*; Or againe that hold them *Better Pleased* and *Content*; are *Liquefiable*: For these three *Dispositions* of *Bodies*, doe arrest the *Emission* of the *Spirits*. An Example of the first two *Properties* is in *Metalls*; And of the last in *Grease*, *Pitch*, *Sulphure*, *Butter*, *Wax*, &c. The *Disposition* not to *Liquefie* proceedeth from the *Easie Emission* of the *Spirits*, whereby the *Grosser Parts* contract: And therefore, *Bodies Ieiune* of *Spirits*; Or which part with their *Spirits* more *Willingly*; are not *Liquefiable*; As *Wood*, *Clay*, *Free-Stone*, &c. But yet, even many of those *Bodies*, that will not *Melt*, or will hardly *Melt*, will notwithstanding *Soften*; As *Iron* in the Forge; And a *Sticke* bathed in Hot Ashes, which thereby becommeth more Flexible. Moreover, there are some *Bodies*, which doe *Liquefie*, or dissolve by *Fire*; As *Metalls*, *Wax*, &c. And other *Bodies*, which dissolve in *Water*; As *Salt*, *Sugar*, &c. The *Cause* of the former proceedeth from the *Dilatation* of the *Spirits* by *Heat*: The *Cause* of the Latter proceedeth from the *Opening* of the *Tangible Parts*, which desire to receive the *Liquour*. Againe, there are some *Bodies*, that dissolve with both; As *Gumme*, &c. And those be such *Bodies*, as on the One Side have good store of *Spirit*; And on the other Side, have the *Tangible Parts Indigent* of *Moisture*; For the former helpeth to the *Dilating* of the *Spirits* by the *Fire*; And the Latter stimulateth the Parts to Receive the *Liquour*.

Experiment Solitary, touching *Bodies Fragile*, and *Tough*.

841

OF *Bodies*, some are *Fragile*; And some are *Tough*, and *Not Fragile*; And in the *Breaking*, some *Fragile Bodies* breake but where the *Force* is; Some shatter and flie in many Peeces. Of *Fragilitie* the *Cause* is an *Impotencie* to be *Extended*: And therefore *Stone* is more *Fragile* than *Metall*; And so *Fictile Earth* is more *Fragile* than *Crude Earth*; And *Dry wood* than *Greene*. And the *Cause* of this *Vnaptnesse* to *Extension*, is the Small *Quantitie* of *Spirits*; (For it is the *Spirit* that furthereth the *Extension* or *Dilatation* of *Bodies*;) And it is ever Concomitant with *Porositie*, and with *Drinesse* in the *Tangible Parts*: *Contrariwise*, *Tough Bodies* have more *Spirit*, and fewer *Pores*, and *Moister Tangible Parts*: Therefore we see that *Parchment*, or *Leather* will stretch, *Paper* will not; *Woollen Cloth* will tenter, *Linnen* scarcely.

All

ALL *Solide Bodies* consist of *Parts* of two severall *Natures*; *Pneumaticall*, and *Tangible*; And it is well to be noted, that the *Pneumaticall Substance* is in some *Bodies*, the *Native Spirit* of the *Body*; And in some other, plaine *Aire* that is gotten in; As in *Bodies desiccate*, by *Heat*, or *Age*: For in them, when the *Native Spirit* goeth forth, and the *Mristure* with it, the *Aire* with time getteth into the *Pores*. And those *Bodies* are ever the more *Fragile*; For the *Native Spirit* is more *Teelding*, and *Extensive*, (especially to follow the *Parts*,) than *Aire*. The *Native Spirits* also admit great Diversitie; As *Hot*, *Cold*, *Active*, *Dull*, &c. Whence proceed most of the *Vertues*, and *Qualities* (as we call them) of *Bodies*: But the *Aire Intermixt*, is without *Vertues*, and maketh Things *Insipide*, and without any *Extimulation*.

Experiment Solitary, touching the *Two Kinds* of *Pneumaticals* in *Bodies*. 842

THe *Concretion* of *Bodies* is (commonly) solved by the *Contrarie*; As *Ice*, which is congealed by *Cold*, is dissolved by *Heat*; *Salt* and *Sugar*, which are Excocted by *Heat*, are Dissolved by *Cold*, and *Moisture*. The *Cause* is, for that these *Operations*, are rather *Returnes* to their former *Nature*, than *Alterations*: So that the *Contrarie* cureth. As for *Oyle*, it doth neither easily congeale with *Cold*, nor thicken with *Heat*. The *Cause* of both *Effects*, though they be produced by Contrarie *Efficients*, seemeth to be the Same; And that is, because the *Spirit* of the *Oyle*, by either Meanes, exhaleth little; For the *Cold* keepeth it in; and the *Heat*, (except it be Vehement,) doth not call it forth. As for *Cold*, though it take hold of the *Tangible Parts*, yet as to the *Spirits*, it doth rather make them Swell, than Congeale them: As when *Ice* is congealed in a *Cup*, the *Ice* will Swell in steed of Contracting; And sometimes Rift.

Experiment Solitary, touching *Concretion*, and *Dissolution* of *Bodies*. 843

OF *Bodies*, some (we see) are *Hard*, and some *Soft*: The *Hardnesse* is caused (chiefly) by the *Iejuneness* of the *Spirits*; And their *Imparitie* with the *Tangible Parts*: Both which, if they be in a greater degree, maketh them, not only *Hard*, but *Fragile*, and lesse Enduring of *Pressure*; As *Steele*, *Stone*, *Glasse*, *Drie Wood*, &c. *Softnesse* commeth (contrariwise) by the Greater *Quantitie* of *Spirits*; (which ever helpeth to Induce *Yeelding* and *Cession*;) And by the more *Equall Spreading* of the *Tangible Parts*, which thereby are more *Sliding*, and *Following*; As in *Gold*, *Lead*, *Wax*, &c. But note, that *Soft Bodies*, (as we use the word,) are of two *Kinds*; The one, that easily giveth place to another *Body*, but altereth not *Bulke*, by Rising in other *Places*: And therefore we see that *Wax*, if you put any Thing into it, doth not rise in *Bulke*, but only giveth Place: For you may not thinke, that in *Printing* of *Wax*, the *Wax* riseth up at all; But onely the *depressed Part* giveth place, and the other remaineth as it was. The other, that altereth *Bulke* in the *Cession*; As *Water*, or other *Liquours*, if you put a *Stone*, or any Thing into them, they give place (indeed) easily, but then they rise all over: Which is a False *Cession*; For it is in *Place*, and not in *Body*.

Experiment Solitary, touching *Hard* & *Soft Bodies*. 844

All

Experiment Solitary, touching *Bodies Ductile*, and *Tensile*.

845

ALL *Bodies Ductile*, and *Tensile*, (as *Metals* that will be drawne into *Wires*; *Wooll* and *Towe* that will be drawne into *Yarne*, or *Thred*;) have in them the *Appetite* of *Not Discontinuing*, Strong; Which maketh them follow the Force, that pulleth them out; And yet so, as not to *Discontinue* or forsake their owne *Body*. *Viscous Bodies*, (likewise,) as *Pitch*, *Wax*, *Bird-Lime*, *Cheese toasted*, will draw forth, and roape. But the difference betweene *Bodies Fibrous*, and *Bodies Viscous*, is Plaine; For all *wooll*, and *Towe*, and *Cotton*, and *Silke*, (especially raw *Silke*.) have, besides their Desire of *Continuance*, in regard of the *Tenuitie* of their *Thred*, a *Greedinesse* of *Moisture*; And by *Moisture* to joyne and incorporate with other *Thred*; Especially if there be a little *Wreathing*; As appeareth by the *Twisting* of *Thred*; And the Practice of *Twirling* about of *Spindles*. And wee see also, that *Gold* and *Silver Thred* cannot be made without *Twisting*.

Experiment Solitary, touching other *Passions* of *Matter*; and *Characters* of *Bodies*.

846

THe *Differences* of *Impressible* and *Not Impressible*; *Figurable* and *Not Figurable*; *Mouldable* and *Not Mouldable*; *Scissible* and *Not Scissible*; And many other *Passions* of *Matter*, are *Plebeian Notions*, applied unto the *Instruments* and *Vses* which Men ordinarily practise; But they are all but the *Effects* of some of these *Causes* following; Which we will Enumerate without Applying them, because that would be too long. The First is the *Cession*, or *Not Cession* of *Bodies*, into a *Smaller Space* or *Roome*, keeping the Outward *Bulke*, and not flying up. The Second is the *Stronger* or *Weaker Appetite*, in *Bodies*, to *Continuitie*, and to flie *Discontinuitie*. The Third is the *Disposition* of *Bodies*, to *Contract*, or *Not Contract*; And againe, to *Extend*, or *Not Extend*. The Fourth is the *Small Quantitie*, or *Great Quantitie*, of the *Pneumaticall* in *Bodies*. The Fifth is the *Nature* of the *Pneumaticall*, whether it be *Native Spirit* of the *Body*, or *Common Aire*. The Sixth is, the *Nature* of the *Native Spirits* in the *Body*, whether they be *Active* and *Eager*, or *Dull* and *Gentle*. The seventh is the *Emission* or *Detention* of the *Spirits* in *Bodies*. The Eight is the *Dilatation*, or *Contraction* of the *Spirits* in *Bodies*, while they are detained. The Ninth is the *Collocation* of the *Spirits* in *Bodies*; whether the *Collocation* be *Equall*, or *Vnequall*; And againe, whether the *Spirits* be *Coacervate*, or *Diffused*. The Tenth is the *Densitie*, or *Raritie* of the *Tangible Parts*. The Eleventh is the *Equalitie* or *Inequalitie* of the *Tangible Parts*. The Twelfth is the *Disgestion*, or *Cruditie* of the *Tangible Parts*. The Thirteenth is the *Nature* of the *Matter*, whether *Sulphureous* or *Mercuriall*, *Watrie* or *Oylie*, *Drie* and *Terrestriall*, or *Moist* and *Liquid*; which *Natures* of *Sulphureous* and *Mercuriall*, seeme to be *Natures Radicall*, and *Principall*. The Fourteenth is the *Placing* of the *Tangible Parts*, in *Length*, or *Transverse*; (As it is in the *Warpe*, and the *Woofe*, of *Textiles*;) *More Inward*, or *More Outward*; &c. The Fifteenth is the *Porositie*, or *Imporositie* betwixt the *Tangible Parts*; And the *Greatnesse*, or *Smalnesse* of the *Pores*. The Sixteenth is the *Collocation* and *Posture* of the *Pores*. There may be more *Causes*; but these doe occurre for the Present.

Take

TAke *Lead*, and melt it, and in the Middeſt of it, when it beginneth to Congeale, make a little Dint, or Hole, and put *Quicke-Silver* wrapped in a Peece of *Linnen* into that Hole, and the *Quicke-ſilver* will fix, and run no more, and endure the Hammer. This is a Noble *Inſtance* of *Induration*, by *Conſent* of one *Body* with another, and *Motion* of *Excitation* to *Imitate*; For to aſcribe it onely to the *Vapour* of *Lead*, is leſſe Probable. *Quære* whether the *Fixing* may be in ſuch a degree, as it will be Figured like other *Metals*? For if ſo, you may make Works of it for ſome purpoſes, ſo they come not neere the *Fire*.

Experiment Solitary, touching *Induration* by *Sympathie*. 847

SVgar hath put downe the uſe of *Honey*; Inſomuch as wee have loſt thoſe *Obſervations*, and *Preparations* of *Honey*, which the *Ancients* had, when it was more in Price. Firſt, it ſeemeth that there was, in old time, *Tree-Honey*, as well as *Bee-Honey*; Which was the *Teare* or *Bloud* iſſuing from the *Tree*: Inſomuch as one of the *Ancients* relateth, that in *Trebiſond*, there was *Honey* iſſuing from the *Box-Trees*, which made *Men* Mad. Againe, in Ancient time, there was a Kinde of *Honey*, which either of the owne Nature, or by Art, would grow as Hard as *Sugar*; And was not ſo Luſhious as Ours. They had alſo a *Wine* of *Honey*, which they made thus. They cruſhed the *Honey* into a great *Quantitie* of *Water*, and then ſtrained the *Liquour*; After they boyled it in a Copper to the halfe: Then they powred it into *Earthen Veſſels*, for a ſmall time; And after tunned it into *Veſſels* of *Wood*, and kept it for many yeares. They have alſo, at this day, in *Ruſſia*, and thoſe *Northerne Countries*, *Mead Simple*, which (well made, and ſeaſoned) is a good wholeſome *Drinke*, and very Cleare. They uſe alſo in *Wales*, a Compound *Drinke* of *Mead*, with *Herbs*, and *Spices*. But meane-while it were good, in recompence of that we have loſt in *Honey*, there were brought in uſe a *Sugar-Mead*, (for ſo wee may call it,) though without any *Mixture* at all of *Honey*; And to brew it, and keepe it ſtale, as they uſe *Mead*; For certainly, though it would not be ſo *Abſterſive*, and *Opening*, and *Solutive* a *Drinke* as *Mead*; yet it will be more gratefull to the *Stomach*, and more *Lenitive*, and fit to be uſed in *Sharpe Diſeaſes*: For wee ſee, that the uſe of *Sugar* in *Beere*, and *Ale*, hath good *Effects* in ſuch Caſes.

Experiment Solitary, touching *Honey* and *Sugar*. 848

IT is reported by the *Ancients*, that there was a Kinde of *Steele*, in ſome places, which would poliſh almoſt as white and bright as *Silver*. And that there was in *India* a Kinde of *Braſſe*, which (being poliſhed) could ſcarce be diſcerned from *Gold*. This was in the *Naturall Vre*; But I am doubtfull, whether Men have ſufficiently refined *Metals*, which we count *Baſe*; As whether *Iron*, *Braſſe*, and *Tinne*, be refined to the Heighth? But when they come to ſuch a Fineneſſe, as ſerveth the ordinary uſe, they trie no further.

Experiment Solitary, touching the *Finer Sort* of *Baſe Metals*. 849

THere have beene found certaine *Cements* under *Earth*, that are very Soft; And yet, taken forth into the *Sunne*, harden as Hard as *Marble*: There

Experiment Solitary, touching *Cements* and *Quarries*. 850

There are also ordinary *Quarries* in *Sommerset-Shire*, which in the *Quarry* cut soft to any Bigneſſe, and in the *Building* prove firme, and hard.

Experiment Solitary, touching the *Altering* of the *Colour* of *Haires* and *Feathers*.
851

Living Creatures (generally) doe change their *Haire* with *Age*, turning to be *Gray*, and *White:* As is seene in *Men*, though some Earlier, some Later; In *Horses*, that are Dappled, and turne *White*; In *Old Squirrels*, that turne *Grisly*; And many Others. So doe some *Birds*; As *Cygnets*, from *Gray* turne *white*; *Hawkes*, from *Browne* turne more *White:* And some *Birds* there be, that upon their *Moulting*, doe turne *Colour*; As *Robin-Red-brests*, after their *Moulting*, grow to be *Red* againe, by degrees; So doe *Gold-Finches* upon the *Head*. The *Cause* is, for that *Moisture* doth (chiefly) colour *Haire*, and *Feathers*; And *Drineſſe* turneth them *Gray* and *White*; Now *Haire* in *Age* waxeth *Drier*: So doe *Feathers*. As for *Feathers*, after *Moulting*, they are *Young Feathers*, and so all one as the *Feathers* of *Young Birds*. So the *Beard* is younger than the *Haire* of the *Head*, and doth (for the most part,) wax *Hoare* later. Out of this Ground, a *Man* may deviſe the *Meanes* of *Altering* the *Colour* of *Birds*, and the *Retardation* of *Hoare-Haires*. But of this see the fifth *Experiment*.

Experiment Solitary, touching the *Differences* of *Living Creatures*, *Male* & *Female*.
852

THe *Difference* betweene *Male* and *Female*, in some *Creatures*, is not to be discerned, otherwise than in the *Parts* of *Generation*: As in *Horses* and *Mares*, *Dogs* and *Bitches*, *Doves He* and *Shee*, and others. But some differ in *Magnitude*, and that diversly; For in most the *Male* is the greater; As in *Man*, *Pheasants*, *Peacocks*, *Turkey's*; and the like: And in some few, as in *Hawkes*, the *Female*. Some differ in the *Haire*, and *Feathers*, both in the *Quantitie*, *Crispation*, and *Colours* of them; As *He-Lions* are *Hirsute*, and have great *Maines*; The *She's* are smooth like *Cats*. *Bulls* are more *Crispe* upon the *Fore-head* than *Cowes*; The *Peacocke*, and *Pheasant-Cocke*, and *Gold-Finch-Cocke*, have glorious and fine *Colours*; The *Henn's* have not. Generally, the Hees in *Birds* have the faireſt *Feathers*. Some differ in divers *Features*; As *Bucks* have *Hornes*, *Doe's* none; *Rammes* have more *Wreathed Hornes* than *Ewes*; *Cocks* have great *Combes* and *Spurres*. *Henns* little or none; *Boares* have great *Fangs*, *Sowes* much leſſe; The *Turky-Cocke* hath great and Swelling *Gills*, the *Hen* hath leſſe; *Men* have generally Deeper and Stronger *Voices* than *women*. Some differ in *Facultie*; As the *Cocks* amongst *Singing Birds*, are the beſt *Singers*. The Chiefe *Cause* of all theſe, (no doubt,) is, for that the *Males* have more Strength of *Heat* than the *Females*; Which appeareth manifeſtly in this, that all young *Creatures Males*, are like *Females*; And so are *Eunuchs*, and *Gelt Creatures* of all kinds, liker *Females*. Now *Heat* causeth *Greatneſſe* of *Growth*, generally, where there is *Moisture* enough to worke upon: But if there be found in any *Creature*, (which is seene rarely,) an Over-great *Heat* in proportion to the *Moisture*, in them the *Female* is the greater; As in *Hawkes*, and *Sparrowes*. And if the *Heat* be ballanced with the *Moisture*, then there is no *Difference* to be seene betweene *Male* and *Female*:

male: As in the *Instances* of *Horses*, and *Dogs*. Wee see also, that the *Hornes* of *Oxen*, and *Cowes*, for the most part, are Larger than the *Bulls*; which is caused by abundance of *Moisture*, which in the *Hornes* of the *Bull* faileth. Againe, *Heat* causeth *Pilositie*, and *Crispation*; And so likewise *Beards* in *Men*. It also expelleth finer *Moisture*, which Want of *Heat* cannot Expell: And that is the *Cause* of the *Beautie* and *Varietie* of *Feathers:* Againe *Heat* doth put forth many *Excrescences*, and much Solide *Matter*, which Want of *Heat* cannot do: And this is the *Cause* of *Hornes*, and of the *Greatnesse* of them; And of the *Greatnesse* of the *Combs* and *Spurres* of *Cocks*, *Gills* of *Turky-Cocks*, and *Fangs* of *Boares*. *Heat* also dilateth the *Pipes*, and *Organs*, which causeth the *Deepnesse* of the *Voice*. Againe, *Heat* refineth the *Spirits*, and that causeth the *Cock Singing Bird*, to Excell the *Hen*.

Experiment Solitary, touching the *Comparative Magnitude* of *Living Creatures*. 853

THere be *Fishes* greater than any *Beasts*; As the *Whale* is farre greater than the *Elephant*. And *Beasts* are (generally) greater than *Birds*. For *Fishes*, the *Cause* may be, that because they Live not in the *Aire*, they have not their *Moisture* drawne & Soaked by the *Aire*, and *Sun-Beames*. Also they rest alwayes, in a manner, and are supported by the *water*; whereas *Motion* and *Labour* doe consume. As for the *Greatnesse* of *Beasts*, more than of *Birds*, it is caused, for that *Beasts* stay Longer time in the *Womb*, than *Birds*, and there Nourish, and Grow; Whereas in *Birds*, after the *Egge* Lay'd, there is no further *Growth*, or *Nourishment* from the *Female:* For the *Sitting* doth *Vivifie*, and not Nourish.

Experiment Solitary, touching *Exossation* of *Fruits*. 854

WE have partly touched before the *Meanes* of *Producing Fruits*, without *Coares*, or *Stones*. And this wee adde further, that the *Cause* must be *Abundance* of *Moisture*; For that the *Coare*, and *Stone* are made of a *Dry Sap:* And wee see that it is possible, to make a *Tree* put forth onely in *Blossome*, without *Fruit*; As in *Cherries* with *Double Flowers*; Much more in *Fruit* without *Stone*, or *Coares*. It is reported, that a *Cions* of an *Apple*, grafted upon a *Colewort-Stalke*, sendeth forth a great *Apple* without a *Coare*. It is not unlikely, that if the *Inward Pith* of a *Tree*, were taken out, so that the Juyce came onely by the *Barke*, it would worke the *Effect*. For it hath beene observed, that in *Pollards*, if the *water* get in on the *Top*, and they become Hollow, they put forth the more. We adde also, that it is delivered for certaine by some, that if the *Cions* be grafted, the Small End downwards, it will make *Fruit* have little or no *Coares*, and *Stones*.

Experiment Solitary, touching the *Melioration* of *Tobacco*. 855

TObacco is a thing of great Price, if it be in request. For an *Acre* of it will be worth, (as is affirmed,) two Hundred Pounds, by the yeare, towards Charge. The Charge of making the Ground, and otherwise, is great, but nothing to the Profit. But the *English Tobacco*, hath small credit, as being too *Dull*, and *Earthy:* Nay the *Virginian Tobacco*, though that be in a *Hotter Climate*, can get no credit, for the same *Cause:* So that

a Triall to make *Tobacco* more *Aromaticall*, and better Concocted here in *England*, where a Thing of great profit. Some have gone about to doe it by Drenching the *English Tobacco*, in a *Decoction* or *Infusion* of *Indian Tobacco:* But those are but Sophisticarions, and Toyes; For Nothing that is once Perfect, and hath run his Race, can receive much Amendment. You must ever resort to the Beginnings of Things for *Melioration*. The Way of *Maturation* of *Tobacco* must, as in other *Plants*, be, from the *Heat*, Either of the *Earth*, or of the *Sunne:* We see some Leading of this in Musk-Melons; which are sowen upon a *Hot Bed*, Dunged below, upon a Banke turned upon the *South Sunne*, to give *Heat* by *Reflexion*; Laid upon *Tiles*, which increaseth the *Heat*; And Covered with *Straw* to keepe them from *Cold*. They remove them also, which addeth some *Life:* And by these Helps they become as good in *England*, as in *Italy*, or *Provence*. These, and the like Meanes, may be tried in *Tobacco*. Enquire also of the *Steeping* of the *Roots*, in some such *Liquour*, as may give them Vigour to put forth Strong.

Experiment Solitary, touching severall *Heats*, working the same *Effects*. 856

Heat of the *Sunne*, for the *Maturation* of *Fruits*; Yea and the *Heat* of *Vivification* of *Living Creatures*; are both represented and supplyed, by the *Heat* of *Fire*; And likewise, the *Heats* of the *Sunne*, and *Life*, are represented one by the other. *Trees*, set upon the *Backs* of *Chimneyes*, doe ripen *Fruit* sooner. *Vines*, that have beene drawne in at the Window of a *Kitchen*, have sent forth *Grapes* ripe a Moneth (at least) before others. *Stoves*, at the Backe of Walls, bring forth *Orenges* here with us. *Egges*, as is reported by some, have beene hatched in the warmth of an *Oven*. It is reported by the *Ancients*, that the *Estrich* Layeth her *Egges* under *Sand*, where the *Heat* of the *Sunne* discloseth them.

Experiment Solitary, touching *Swelling* and *Dilatation* in *Boyling*. 857

Barley in the *Boyling* swelleth not much; *Wheat* swelleth more; *Rize* extremely; In so much as a Quarter of a Pint (unboyled) will arise to a Pint boyled. The *Cause* (no doubt) is, for that the more Close and Compact the *Body* is, the more it will dilate: Now *Barley* is the most Hollow; *Wheat* more Solide than that; and *Rize* most Solide of all. It may be also that some *Bodies* have a Kinde of *Lentour*, and more *Depertible Nature* than others; As we see it Evident in *Colouration*; For a Small *Quantitie* of *Saffron*, will Tinct more, than a verie great *Quantitie* of *Bresill*, or *Wine*.

Experiment Solitary, touching the *Dulceration* of *Fruits*. 858

Fruit groweth *Sweet* by *Rowling*, or *Pressing* them gently with the *Hand*; As *Rowling-Peares*, *Damasins*, &c. By *Rottennesse*; As *Medlars*, *Services*, *Sloe's*, *Heps*, &c. By *Time*; As *Apples*, *Wardens*, *Pomgranats*, &c. By certaine Speciall *Maturations*; As by *Laying* them in *Hay*, *Straw*, &c. And by *Fire*; As in *Roasting*, *Stewing*, *Baking*, &c. The *Cause* of the *Sweetnesse* by *Rowling*, and *Pressing*, is *Emollition*, which they properly enduce; As in Beating of *Stock-Fish*, *Flesh*, &c. By *Rottennesse* is, for that the *Spirits* of the *Fruit*, by *Putrefaction*, gather *Heat*, and thereby disgest the

the Harder Part: For in all *Putrefactions*, there is a *Degree* of *Heat*. By *Time* and *Keeping* is, becauſe the *Spirits* of the *Body*, doe ever feed upon the *Tangible Parts*, and attenuate them. By Severall *Maturations* is, by ſome *Degree* of *Heat*. And by *Fire* is, becauſe it is the Proper Worke of *Heat* to Refine, and to Incorporate; And all *Soureneſſe* conſiſteth in ſome *Groſſeneſſe* of the *Body*: And all *Incorporation* doth make the *Mixture* of the *Body*, more *Equall*, in all the *Parts*; Which ever induceth a Milder *Taſte*.

Experiment Solitary, touching *Fleſh Edible*, and not *Edible*. 859

OF *Fleſhes*, ſome are *Edible*; Some, except it be in *Famine*, not. For thoſe that are not *Edible*, the *Cauſe* is, for that they have (commonly) too much *Bitterneſſe* of *Taſte*; And therefore thoſe *Creatures*, which are Fierce and Cholerick, are not *Edible*; As *Lions*, *Wolves*, *Squirrells*, *Dogs*, *Foxes*, *Horſes*, &c. As for *Kine*, *Sheepe*, *Goats*, *Deere*, *Swine*, *Conneyes*, *Hares*, &c. We ſee they are *Milde*, and *Fearefull*. Yet it is true, that *Horſes*, which are *Beaſts* of Courage, have beene, and are eaten by ſome *Nations*; As the *Scythians* were called *Hippophagi*; And the *Chineſes* eat *Horſe-fleſh* at this day; And ſome *Gluttons* have uſed to haue *Colts-fleſh* baked. In *Birds*, ſuch as are *Carnivoræ*, and *Birds* of *Prey*, are commonly no Good *Meat*; But the Reaſon is, rather the *Cholerick Nature* of thoſe *Birds*, than their *Feeding* upon *Fleſh*; For *Puits*, *Gulls*, *Shovelers*, *Ducks*, doe feed upon *Fleſh*, and yet are good *Meat*: And wee ſee, that thoſe *Birds*, which are of *Prey*, or feed upon *Fleſh*, are good *Meat*, when they are verie Young; As *Hawkes*, *Rookes* out of the Neſt, *Owles*, &c. *Mans Fleſh* is not Eaten. The Reaſons are Three: Firſt, becauſe *Men* in *Humanitie* doe abhorre it: Secondly, becauſe no *Living Creature*, that *Dyeth* of *it ſelfe*, is good to Eat: And therefore the *Caniballs* (themſelves) eat no *Mans-fleſh*, of thoſe that *Dye* of *Themſelves*, but of ſuch as are *Slaine*. The Third is, becauſe there muſt be (generally) ſome *Diſparitie*, between the *Nouriſhment*, and the *Body Nouriſhed*; And they muſt not be Over-neere, or like: yet we ſee, that in great *Weakneſſes*, and *Conſumptions*, *Men* have beene ſuſtained with *Womans Milke*: And *Ficinus* fondly (as I conceive) adviſeth, for the *Prolongation* of *Life*, that a *Veine* be opened in the *Arme* of ſome wholeſome *Young Man*; And the *Bloud* to be ſucked. It is ſaid, that *Witches* doe greedily eat *Mans fleſh*; which if it be true, beſides a *Divelliſh Appetite* in them, it is likely to proceed, for that *Mans fleſh* may ſend up High and Pleaſing *Vapours*, which may ſtirre the *Imagination*; And *Witches* Felicitie is chiefly in *Imagination*, as hath beene ſaid.

Experiment Solitary, touching the *Salamander*. 860

THere is an Ancient Received *Tradition* of the *Salamander*, that it liveth in the *Fire*, and hath force alſo to extinguiſh the *Fire*. It muſt have two Things, if it be true, to this *Operation*: The One a verie *Cloſe Skin*, whereby *Flame*, which in the Midſt is not ſo hot, cannot enter: For we ſee that if the *Palme* of the *Hand* be annointed thicke with *White* of *Egge*, and then *Aquavitæ* be poured upon it, and *Enflamed*, yet one may endure the *Flame* a prettie while. The other is ſome *Extreme Cold* and

Quenching vertue, in the *Body* of that *Creature*, which choaketh the *Fire*. We see that *Milke* quencheth *wilde-Fire*, better than *Water*, because it entreth better.

Experiment Solitary, touching the *Contrarie Operations* of *Time*, upon *Fruits*, and *Liquours*. 861

Time doth change *Fruit*, (as *Apples*, *Peares*, *Pomgranats*, &c.) from more *Soure*, to more *Sweet*: But contrariwise *Liquours*, (even those that are of the *Iuyce* of *Fruit*,) from more *Sweet* to more *Soure*; As *Wort*, *Must*, *New Verjuyce*, &c. The *Cause* is, the *Congregation* of the *Spirits* together: For in both Kindes, the *Spirit* is attenuated by *Time*; But in the first Kinde, it is more *Diffused*, and more *Mastered* by the *Grosser Parts*, which the *Spirits* doe but disgest: But in *Drinkes* the *Spirits* doe reigne, and finding lesse Opposition of the *Parts*, become themselves more *Strong*; Which causeth also more Strength in the *Liquour*; Such, as if the *Spirits* be of the Hotter Sort, the *Liquour* becommeth apt to *Burne*; But in Time, it causeth likewise, when the Higher *Spirits* are Evapourated, more *Soureneſſe*.

Experiment Solitary, touching *Blowes* and *Bruises*. 862

It hath beene observed by the *Ancients*, that *Plates* of *Metall*, and especially of *Brasse*, applied presently to a *Blow*, will keepe it downe from *Swelling*. The *Cause* is *Repercussion*, without *Humectation*, or *Entrance* of any *Body*: for the *Plate* hath onely a *Virtuall Cold*, which doth not search into the *Hurt*; Whereas all *Plasters* and *Ointments* doe enter. Surely, the *Cause*, that *Blowes* and *Bruises* induce *Swellings*, is, for that the *Spirits* resorting to Succour the *Part* that Laboureth, draw also the *Humours* with them: For we see, that it is not the *Repulse*, and the *Returne* of the *Humour* in the *Part Strucken*, that causeth it; For that *Gouts*, and *Tooth-Aches* cause *Swelling*, where there is no *Percussion* at all.

Experiment Solitary, touching the *Orris Root*. 863

The *Nature* of the *Orris Root*, is almost Singular; For there be few *Odoriferous Roots*; And in those that are, in any degree, *Sweet*, it is but the same *Sweetneſſe* with the *Wood*, or *Leafe*: But the *Orris* is not *Sweet* in the *Leafe*; Neither is the *Flower* any thing so *Sweet* as the *Root*. The *Root* seemeth to have a Tender daintie *Heat*; Which when it commeth above Ground, to the *Sunne*, and the *Aire*, vanisheth: For it is a great *Mollifier*; And hath a Smell like a *Violet*.

Experiment Solitary, touching the *Compression* of *Liquours*. 864

It hath been observed by the *Ancients*, that a great *Vessell* full, drawne into *Bottles*, And then the *Liquour* put againe into the *Vessell*; will not fill the *Vessell* againe, so full as it was, but that it may take in more *Liquour*: And that this holdeth more in *Wine*, than in *Water*. The *Cause* may be Triviall; Namely, by the *Expence* of the *Liquour*, in regard some may sticke to the Sides of the *Bottles*: But there may be a *Cause* more Subtill; Which is, that the *Liquour* in the *Vessell*, is not so much *Compressed*, as in the *Bottle*; Because in the *Vessell*, the *Liquour* meeteth with *Liquour* chiefly; But in the *Bottles* a Small Quantitie of *Liquour*, meeteth

teth with the Sides of the *Bottles*, which Compresse it so, that it doth not Open againe.

Water, being contiguous with *Aire*, Cooleth it, but Moisteneth it not, except it *Vapour*. The *Cause* is, for that *Heat* and *Cold* have a *Virtuall Transition*, without *Communication* of *Substance*; but *Moisture* not: And to all *Madefaction* there is required an *Imbibition*: But where the *Bodies* are of such severall Levitie, and Gravitie, as they Mingle not, there can follow no *Imbibition*. And therefore, *Oyle* likewise lyeth at the *Top* of the *Water*, without Commixture: And a *Drop* of *Water*, running swiftly over a *Straw*, or *Smooth Body*, wetteth not.

Experiment Solitary, touching the *Working* of *Water* upon *Aire Contiguous*. 865

Starre-light Nights, yea and bright *Moone-shine Nights*, are *Colder* than *Cloudy Nights*. The *Cause* is, the *Drineſſe* and *Fineneſſe* of the *Aire*, which thereby becommeth more *Piercing*, and *Sharp*: And therefore *Great Continents* are colder than *Islands*: And as for the *Moone*, though it selfe inclineth the *Aire* to *Moisture*, yet when it shineth bright, it argueth the *Aire* is dry. Also *Close Aire* is warmer than *Open Aire*; which (it may be) is, for that the true *Cause* of *Cold*, is an *Expiration* from the *Globe* of the *Earth*, which in open *Places* is stronger; And againe, *Aire* it selfe, if it be not altered by that *Expiration*, is not without some Secret *Degree* of *Heat*: As it is not likewise without some Secret *Degree* of *Light*: For otherwise *Cats*, and *Owles*, could not see in the *Night*; But that *Aire* hath a little *Light*, Proportionable to the *Visuall Spirits* of those *Creatures*.

Experiment Solitary, touching the *Nature* of *Aire*. 866

THe *Eyes* doe move one and the same way; For when one *Eye* moveth to the *Nosthrill*, the other moveth from the *Nosthrill*. The *Cause* is *Motion* of *Consent*, which in the *Spirits*, and *Parts Spirituall*, is Strong. But yet *Vse* will induce the Contrarie: For some can *Squint*, when they will: And the Common *Tradition* is, that if *Children* be set upon a Table, with a Candle behinde them, both *Eyes* will move Outwards; As affecting to see the *Light*, and so induce *Squinting*.

Experiments in Consort touching the *Eyes*, and *Sight*. 867

Wee see more exquisitely with *One Eye Shut*, than with *Both Open*. The *Cause* is, for that the *Spirits Visuall* unite themselves more, and so become Stronger. For you may see, by looking in a *Glasse*, that when you shut one *Eye*, the *Pupill* of the other *Eye*, that is Open, Dilateth. 868

The *Eyes*, if the *Sight* meet not in one *Angle*, *See Things Double*. The *Cause* is, for that *Seeing* two Things, and *Seeing* one Thing twice, worketh the same *Effect*: And therefore a little *Pellet*, held betweene two *Fingers*, laid a-crosse, seemeth *Double*. 869

Pore-blinde Men, see best in the *Dimmer Light*; And likewise have their *Sight* Stronger neere hand, than those that are not *Pore-blinde*; And can Reade and Write smaller *Letters*. The *Cause* is, for that the *Spirits Visuall*, in those that are *Pore-blinde*, are Thinner, and Rarer, than in others; And therefore the Greater *Light* dispersed them. For the same 870

Cauſe they need Contracting; But being *Contracted*, are more ſtrong, than the *Viſuall Spirits* of Ordinarie *Eyes* are; As when we ſee thorow a *Levell*, the *Sight* is the Stonger: And ſo is it, when you gather the *Eye-lids* ſomewhat cloſe: And it is commonly ſeene in thoſe that are *Pore-blinde*, that they doe much gather the *Eye-lids* together. But *Old Men*, when they would ſee to Read, put the Paper ſomewhat a farre off. The *Cauſe* is, for that *Old Mens Spirits Viſuall*, contrarie to thoſe of *Pore-blinde Men*, unite not, but when the *Object* is at ſome good diſtance, from their *Eyes*.

871 *Men* ſee better, when their *Eyes* are over-againſt the *Sunne*, or a *Candle*, if thy put their *Hand* a little before their *Eye*. The *Reaſon* is, for that the *Glaring* of the *Sunne*, or the *Candle*, doth weaken the *Eye*; whereas the *Light Circumfuſed* is enough for the *Perception*. For wee ſee, that an *Over-light* maketh the *Eyes* Dazell; Inſomuch as Perpetuall Looking againſt the *Sunne*, would Cauſe *Blindneſſe*. Againe, if *Men* come out of a *Great Light*, into a *Darke Roome*; And contrariwiſe, if they come out of a *Darke Roome*, into a *Light Roome*, they ſeeme to have a *Miſt* before their *Eyes*, and ſee worſe, than they ſhall doe, after they have ſtayed a little while, either in the *Light*, or in the *Darke*. The *Cauſe* is, for that the *Spitits Viſuall*, are upon a Sudden Change, diſturbed, and put out of Order; And till they be recollected, doe not performe their Function well. For when they are much *Dilated* by *Light*, they cannot *Contract* ſuddenly; And when they are much *Contracted* by *Darkneſſe*, they cannot *Dilate* ſuddenly. And Exceſſe of both theſe, (that is, of the *Dilatation*, and *Contraction* of the *Spirits Viſuall*,) if it be long, Deſtroyeth the *Eye*. For as long Looking againſt the *Sunne*, or *Fire*, hurteth the *Eye* by *Dilatation*; So *Curious Painting* in *Small Volumes*, and *Reading* of *Small Letters*, doe hurt the *Eye* by *Contraction*.

872 It hath beene obſerved, that in *Anger*, the *Eyes* wax *Red*; And in *Bluſhing*, not the *Eyes*, but the *Eares*, and the *Parts* behinde them. The *Cauſe* is, for that in *Anger*, the *Spirits* aſcend and wax Eager; Which is moſt eaſily ſeene in the *Eyes*, becauſe they are Tranſlucide; Though withall it maketh both the *Cheekes*, and the *Gills Red*; But in *Bluſhing*, it is true, the *Spirits* aſcend likewiſe to Succour, both the *Eyes*, and the *Face*, which are the *Parts* that labour: But then they are repulſed by the *Eyes*, for that the *Eyes*, in Shame doe put backe the *Spirits*, that aſcend to them, as unwilling to looke abroad: For no *Man*, in that *Paſſion*, doth looke ſtrongly, but Dejectedly; And that *Repulſion* from the *Eyes*, Diverteth the *Spirits* and *Heat* more to the *Eares*, and the *Parts* by them.

873 The *Objects* of the *Sight*, may cauſe a great *Pleaſure* and *Delight* in the *Spirits*, but no *Paine*, or great *Offence*, Except it be by *Memory*, as hath beene ſaid. The *Glimpſes* and *Beames* of *Diamonds* that ſtrike the *Eye*; *Indian Feathers*, that have glorious Colours; The *Comming* into a *Faire Garden*; The *Comming* into a *Faire Roome* richly furniſhed; A *Beautifull* Perſon; And the like; doe delight and exhilarate the *Spirits* much. The

Reaſon,

Reason, why it holdeth not in the *Offence*, is, for that the *Sight* is the most *Spirituall* of the *Senses*; whereby it hath no *Object* Grosse enough to offend it. But the *Cause* (chiefly) is, for that there be no *Active Objects* to offend the *Eye*. For *Harmonicall Sounds*, and *Discordant Sounds*, are both *Active*, and *Positive*: So are *Sweet Smels*, and *Stinks*: So are *Bitter*, and *Sweet*, in *Tastes*: So are *Over-Hot*, and *Over-Cold*, in *Touch*: But *Blacknesse*, and *Darknesse*, are indeed but *Privatives*; And therefore have little or no *Activitie*. Somewhat they doe Contristate, but verie little.

Experiment Solitary, touching the *Colour* of the *Sea*, or other *Water*. 874

WAter of the *Sea*, or otherwise, looketh *Blacker* when it is moved, and *Whiter* when it resteth. The *Cause* is, for that by meanes of the *Motion*, the *Beames* of light passe not Straight, and therefore must be darkened; whereas, when it resteth, the *Beames* doe passe Straight. Besides, *Splendour* hath a *Degree* of *Whitenesse*; Especially if there be a little *Repercussion*: For a *Looking-Glasse* with the *Steele* behinde, looketh *Whiter*, than *Glasse Simple*. This *Experiment* deserveth to be driven further, in Trying by what Meanes *Motion* may hinder *Sight*.

Experiment Solitary, touching *Shell-Fish*. 875

SHell-*Fish* have beene, by some of the *Ancients*, compared and sorted with the *Insecta*; But I see no reason why they should; For they have *Male*, and *Female*, as other *Fish* have: Neither are they bred of *Putrefaction*; Especially such as doe Move. Nevertheless it is certaine, that *Oisters*, and *Cockles*, and *Muscles*, which Move not, have not discriminate *Sex*: *Quære* in what time, and how they are bred? It seemeth that *Shells* of *Oisters* are bred where none were before; And it is tried, that the great *Horse-Muscle*, with the fine shell, that breedeth in *Ponds*, hath bred within thirtie yeares: But then, which is strange, it hath been tried, that they doe not only Gape, and Shut, as the *Oisters* doe, but Remove from one Place to Another.

Experiment Solitary, touching the *Right Side*, and the *Left*. 876

THe *Senses* are alike Strong, both on the *Right Side*, and on the *Left*; But the *Limmes* on the *Right Side* are Stronger. The *Cause* may be, for that the *Braine*, which is the *Instrument* of *Sense*, is alike on both *Sides*; But *Motion*, and *Habilities* of *Moving*, are somewhat holpen from the *Liver*, which lieth on the *Right Side*. It may be also, for that the *Senses* are put in *Exercise*, indifferently, on both *Sides*, from the Time of our Birth; But the *Limmes* are used most on the *Right Side*, whereby *Custome* helpeth; For we see that some are *Left-Handed*: Which are such, as have used the *Left-Hand* most.

Experiment Solitary touching *Frictions*. 877

FRictions make the *Parts* more *Fleshie*, and *Full*: As wee see both in *Men*; And in *Currying* of *Horses*, &c. The *Cause* is, for that they draw greater *Quantitie* of *Spirits* and *Bloud* to the *Parts*: And againe, because they draw the *Aliment* more forcibly from within: And againe, because they relax the *Pores*, and so make better *Passage* for the *Spirits*, *Bloud*, and *Aliment*: Lastly, because they dissipate and digest any *Inutile* or *Excrementitious*

crementitious Moisture, which lieth in the *Flesh*: All which help *Assimilation*. *Frictions* also doe more *Fill*, and *Impinguate* the *Body*, than *Exercise*. The *Cause* is, for that in *Frictions*, the *Inward Parts* are at rest; Which in *Exercise* are beaten (many times) too much: And for the same Reason, (as we have noted heretofore,) *Gally-Slaves* are *Fat* and *Fleshie*, because they stirre the *Limmes* more, and the *Inward Parts* lesse.

Experiment Solitary touching *Globes* appearing *Flat* at *Distance*. 878

ALL *Globes* afarre off appeare *Flat*. The *Cause* is, for that *Distance*, being a *Secundarie Object of Sight*, is not otherwise discerned, than by more or lesse *Light*; which *Disparitie* when it cannot be discerned, all seemeth *One*: As it is (generally) in *Objects* not distinctly discerned; For so *Letters*, if they be so farre off, as they cannot be discerned, shew but as a *Duskish Paper*: And all *Engravings*, and *Embossings*, (afarre off) appeare *Plaine*.

Experiment Solitary, touching *Shadowes*. 879

THe *Vtmost Parts* of *Shadowes* seeme ever to *Tremble*. The *Cause* is, for that the little *Moats*, which we see in the *Sunne*, doe ever Stirre, though there be no *Wind*; And therefore those Moving, in the Meeting of the *Light* and the *Shadow*, from the *Light* to the *Shadow*, and from the *Shadow* to the *Light*, doe shew the *Shadow* to Move, because the *Medium* Moveth.

Experiment Solitary, touching the *Rowling* and *Breaking* of the *Seas*. 880

Shallow, and *Narrow Seas*, breake more than *Deepe*, and *Large*. The *Cause* is, for that the *Impulsion* being the same in Both; Where there is greater *Quantitie* of *Water*, and likewise *Space* Enough; there the *Water* Rowleth, and Moveth, both more Slowly, & with a Sloper Rise, and Fall: But where there is lesse *Water*, and lesse *Space*, and the *Water* dasheth more against the Bottome; there it moveth more Swiftly, and more in *Precipice*; For in the *Breaking* of the *Waves* there is ever a *Precipice*.

Experiment Solitary, touching the *Dulcoration* of *Salt-water*. 881

IT hath beene observed by the *Ancients*, that *Salt-water Boyled*, or *Boyled* and *Cooled* againe, is more *Potable*, than of it selfe *Raw*: And yet the *Taste* of *Salt*, in *Distillations* by *Fire*, riseth not; For the *Distilled Water* will be *Fresh*. The *Cause* may be, for that the *Salt Part* of the *Water*, doth partly rise into a *Kinde* of *Scumme* on the *Top*; And partly goeth into a *Sediment* in the *Bottome*: And so is rather a *Separation*, than an *Evaporation*. But it is too grosse to rise into a *Vapour*: And so is a *Bitter Taste* likewise; For Simple *Distilled Waters*, of *Wormewood*, and the like, are not Bitter.

Experiment Solitary, touching the *Returne* of *Saltnesse* in *Pits* upon the *Sea-Shore*. 882

IT hath beene set downe before, that *Pits* upon the *Sea-Shoare*, turne into *Fresh Water*, by *Percolation* of the *Salt* through the *Sand*: But it is further noted, by some of the *Ancients*, that in some Places of *Affricke*, after a time, the *Water* in such *Pits* will become *Brackish* againe. The *Cause* is, for that after a time, the verie *Sands*, thorow which the *Salt-Water* passeth, become *Salt*; And so the *Strainer* it selfe is tincted with

Salt.

Salt. The Remedie therefore is, to digge ſtill *New Pits*, when the old wax *Brackiſh*; As if you would change your *Strainer*.

IT hath beene obſerved by the *Ancients*, that *Salt-Water*, will diſſolve *Salt* put into it, in leſſe time, than *Freſh Water* will diſſolve it. The *Cauſe* may be, for that the *Salt* in the *Precedent Water*, doth, by *Similitude* of *Subſtance*, draw the *Salt* new put in, unto it; Whereby it diffuſeth in the *Liquour* more ſpeedily. This is a Noble *Eperiment*, if it be true; For it ſheweth Meanes of more Quick and Eaſie *Infuſions*; And it is likewiſe a good *Inſtance* of *Attraction*, by *Similitude* of *Subſtance*. Trie it with *Sugar* put into *Water*, formerly *Sugred*; And into other *Water Vnſugred*.

Experiment Solitary, touching *Attraction* by *Similitude* of *Subſtance*. 883

PUt *Sugar* into *Wine*, part of it above, part under the *Wine*; And you ſhal finde, (that which may ſeem ſtrange,) that the *Sugar* above the *Wine*, will ſoften and diſſolve ſooner, than that within the *Wine*. The *Cauſe* is, for that the *Wine* entreth that *Part* of the *Sugar*, which is under the *Wine*, by Simple *Infuſion*, or *Spreading*; But that *Part* above the *Wine*, is likewiſe forced by *Sucking*: For all *Spungie Bodies* expell the *Aire*, and draw in *Liquour*, if it be Contiguous: As wee ſee it alſo in *Spunges*, put part above the *Water*. It is worthy the Inquirie, to ſee how you may make more *Accurate Infuſions*, by Help of *Attraction*.

Experiment Solitary, touching *Attraction*. 884

WAter in *Wells* is *warmer* in *Winter*, than in *Summer*: And ſo *Aire* in *Caves*. The *Cauſe* is, for that in the Hither *Parts*, under the *Earth*, there is a *Degree* of ſome *Heat*; (As appeareth in *Sulphureous Veines*, &c.) Which ſhut cloſe in, (as in *Winter*,) is the More; But if it Perſpire, (as it doth in *Summer*,) it is the leſſe.

Experiment Solitary, touching *Heat* under *Earth*. 885

IT is reported, that amongſt the *Leucadians*, in *Ancient* time, upon a Superſtition, they did uſe to Precipitate a *Man*, from a *High Cliffe* into the *Sea*; Tying about him, with Strings, at ſome diſtance, many great *Fowles*; And fixing unto his *Body* divers *Feathers*, ſpred, to breake the *Fall*. Certainly, many *Birds* of good *Wing*, (As *Kites*, and the like,) would beare up a good *Weight*, as they flie; And *Spreading* of *Feathers*, thinne, and cloſe, and in great Bredth, will likewiſe beare up a great *Weight*; Being even laid, without Tilting upon the Sides. The further *Extenſion* of this *Experiment* for *Flying* may be thought upon.

Experiment Solitary, touching *Flying* in the *Aire*. 886

THere is, in ſome Places, (namely in *Cephalonia*,) a little *Shrub*, which thay call *Holy-Oake*, or *Dwarf-Oake*: Upon the *Leaves* whereof there riſeth a *Tumour*, like a *Bliſter*; Which they gather, and rub out of it, a certaine *Red Duſt*, that converteth (after a while) into *Wormes*, which they kill with *Wine*, (as is reported,) when they begin to Quicken: With this *Duſt* they die *Scarlet*.

Experiment Solitary, touching the *Dye* of *Scarlet*. 887

IN *Zant*, it is verie ordinarie, to make *Men Impotent*, to accompany with

Experiment Solitary tou-

ching *Maleficiating.* 888

with their *wives.* The like is Practised in *Gascoine*; Where it is called *Nouêr l' eguillette.* It is practised alwayes upon the *wedding Day.* And in *Zant*, the Mothers themselves doe it, by way of Prevention; Because thereby they hinder other *Charmes*, and can undoe their Owne. It is a Thing the *Civill Law* taketh knowledge of; And therefore is of no Light Regard.

Experiment Solitary, touching the *Rise* of *Water*, by *Meanes* of *Flame.* 889

IT is a Common *Experiment*, but the *Cause* is mistaken. Take a *Pot*, (Or better a *Glasse*, because therein you may see the *Motion*,) And set a *Candle* lighted in the *Bottome* of a *Bason* of *Water*; And turne the *Mouth* of the *Pot*, or *Glasse*, over the *Candle*, & it will make the *Water* rise. They ascribe it, to the *Drawing* of *Heat*; Which is not true: For it appeareth plainly to be but a *Motion* of *Nexe*, which they call *Ne detur vacuum*; And it proceedeth thus. The *Flame* of the *Candle*, as soone as it is covered, being suffocated by the *Close Aire*, lesseneth by little and little: During which time, there is some little Ascent of *Water*, but not much: For the *Flame* Occupying lesse and lesse Roome, as it lesseneth, the *Water* succeedeth. But upon the *Instant* of the *Candles Going out*, there is a sudden *Rise*, of a great deale of *Water*; For that the *Body* of the *Flame* filleth no more Place; And so the *Aire*, and the *Water* succeed. It worketh the same *Effect*, if in stead of *Water*, you put *Flower*, or *Sand*, into the *Bason*: Which sheweth, that it is not the *Flames* Drawing the *Liquour*, as *Nourishment*; As it is supposed; For all *Bodies* are alike unto it; As it is ever in *Motion* of *Nexe*; Insomuch as I have seene the *Glasse*, being held by the Hand, hath lifted up the *Bason*, and all: The *Motion* of *Nexe* did so Clasp the *Bottome* of the *Bason*. That *Experiment*, when the *Bason* was lifted up, was made with *Oyle*, and not with *Water*: Nevertheless this is true, that at the verie first *Setting* of the *Mouth* of the *Glasse*, upon the *Bottome* of the *Bason*, it draweth up the *Water* a little, and then standeth at a Stay, almost till the *Candles Going out*, as was said. This may shew some *Attraction* at first: But of this we will speake more, when we handle *Attractions* by *Heat.*

Experiments in Consort touching the *Influences* of the *Moone.*

Of the *Power* of the *Celestiall Bodies*, and what more Secret *Influences* they have, besides the two Manifest *Influences* of *Heat*, and *Light*, We shall speake, when we handle *Experiments* touching the *Celestiall Bodies*: Meane-while, wee will give some Directions for more certaine *Trials*, of the *Vertue* and *Influences* of the *Moone*; which is our *Neerest Neighbour.*

The *Influences* of the *Moone*, (most observed,) are Foure. The *Drawing forth* of *Heat*: The *Inducing* of *Putrefaction*: The *Increase* of *Moisture*: The *Exciting* of the *Motions* of *Spirits.*

For

890 For the *Drawing forth* of *Heat*, wee have formerly preſcribed, to take *Water Warme*, and to ſet Part of it againſt the *Moone-Beames*, and Part of it with a *Skreene* between; And to ſee whether that which ſtandeth Expoſed to the *Beames*, will not *Cooke* ſooner. But becauſe this is but a Small *Interpoſition*, (though in the *Sunne* wee ſee a Small *Shade* doth much,) it were good to trie it, when the *Moone* ſhineth, and when the *Moone* ſhineth not at all; And with *Water Warme* in a *Glaſſe-Bottle*, aſwell as in a *Diſh*; And with *Cinders*; And with *Iron Red-Hot*; &c.

891 For the *Inducing* of *Putrefaction*, it were good to trie it with *Fleſh*, or *Fiſh*, Expoſed to the *Moone-Beames*; And againe Expoſed to the *Aire*, when the *Moone* ſhineth not, for the like time; To ſee whether will corrupt ſooner: And trie it alſo with *Capon*, or ſome other *Fowle*, laid abroad, to ſee whether it will mortifie, and become tender ſooner? Trie it alſo with Dead *Flies*, or Dead *Wormes*, having a little *Water* caſt upon them, to ſee whether will *Putrifie* ſooner. Trie it alſo with an *Apple*, or *Orenge*, having *Holes* made in their *Tops*, to ſee whether will Rot or Mould ſooner? Trie it alſo with *Holland-Cheeſe*, having *Wine* put into it, whether will breed *Mites* ſooner, or greater?

892 For the *Increaſe* of *Moiſture*, the Opinion Received is; That *Seeds* will grow ſooneſt; And *Haire*, and *Nailes*, and *Hedges*, and *Herbs*, Cut, &c. will grow ſooneſt, if they be Set, or Cut, in the *Increaſe* of the *Moone*. Alſo that *Braines* in *Rabits*, *Wood-cocks*, *Calves*, &c. are fulleſt in the *Full* of the *Moone*: And ſo of *Marrow* in the *Bones*; And ſo of *Oyſters*, and *Cockles*, which of all the reſt are the eaſieſt tried, if you have them in *Pits*.

893 Take ſome *Seeds*, or *Roots*, (as *Onions*, &c.) and ſet ſome of them immediately after the *Change*; And others of the ſame kinde immediately after the *Full*: Let them be as Like as can be: The *Earth* alſo the Same as neere as may be; And therefore beſt in *Pots*: Let the *Pots* alſo ſtand, where no *Raine*, or *Sunne* may come to them, leſt the *Difference* of the *Weather* confound the *Experiment*: And then ſee in what Time, the *Seeds Set* in the *Increaſe* of the *Moone*, come to a certaine Height; And how they differ from thoſe that are *Set* in the *Decreaſe* of the *Moone*.

894 It is like, that the *Braine* of *Man* waxeth *Moiſter*, and *Fuller*, upon the *Full* of the *Moone*: And therefore it were good for thoſe that have *Moiſt Braines*, and are great *Drinkers*, to take *Fume* of *Lignum Aloës*, *Roſe-Mary*, *Frankincenſe*, &c. about the full of the *Moone*. It is like alſo, that the *Humours* in *Mens Bodies*, Increaſe, and Decreaſe, as the *Moone* doth; And therefore it were good to Purge, ſome day, or two, after the *Full*; For that then the *Humours* will not repleniſh ſo ſoone againe.

895 As for the *Exciting* of the *Motion* of the *Spirits*, you muſt note that the *Growth* of *Hedges*, *Herbs*, *Haire*, &c. is cauſed from the *Moone*, by *Exciting* of the *Spirits*, as well as by *Increaſe* of the *Moiſture*. But for *Spiriss* in particular, the great *Inſtance* is in *Lunacies*.

896 There may be other Secret *Effects* of the *Influence* of the *Moone*, which ar enot yet brought into *Obſervation*. It may be, that if it ſo fall

out,

out, that the *Wind* be *North*, or *North-East*, in the *Full* of the *Moone*, it increaseth *Cold*; And if *South*, or *South-West*, it disposeth the *Aire*, for a good while, to *Warmth*, and *Raine*; Which would be observed.

897 It may be, that *Children*, and *Young Cattell*, that are *Brought forth* in the *Full* of the *Moone*, are stronger, & larger, than those that are brought forth in the *Wane*: And those also which are *Begotten* in the *Full* of the *Moone*: So that it might be good *Husbandrie*, to put *Rams*, and *Bulls* to their *Females*, somewhat before the *Full* of the *Moone*. It may be also, that the *Egs* lay'd in the *Full* of the *Moone*, breed the better *Bird*: And a Number of the like *Effects*, which may be brought into *Observation*: *Quære* also, whether great *Thunders*, and *Earth-Quakes*, be not most in the *Full* of the *Moone*.

Experiment Solitary, touching *Vinegar*.

898 THe *Turning* of *Wine* to *Vinegar*, is a Kinde of *Putrefaction*: And in *Making* of *Vinegar*, they use to set *Vessels* of *Wine* over against the *Noone-Sunne*; which calleth out the more *Oyly Spirits*, and leaveth the *Liquour* more *Soure*, and *Hard*. Wee see also, that *Burnt-Wine* is more *Hard*, and *Astringent*, than *Wine Vnburnt*. It is said that *Cider* in *Navigations* under the *Line* ripeneth, when *Wine* or *Beere* sowreth. It were good to set a *Rundlet* of *Verjuyce* over against the *Sunne*, in *Summer*, as they doe *Vinegar*, to see whether it will Ripen, and Sweeten.

Experiment Solitary, touching *Creatures* that *Sleepe* all *Winter*.

899 THere be divers *Creatures*, that *Sleepe* all *Winter*; As the *Beare*, the *Hedge-hog*, the *Bat*, the *Bee*, &c. These all wax *Fat* when they *Sleepe*, and egest not. The *Cause* of their *Fattening*, during their *Sleeping time*, may be the *Want* of *Assimilating*; For whatsoever *Assimilateth* not to *Flesh*, turneth either to *Sweat*, or *Fat*. These *Creatures*, for part of their *Sleeping Time*, have beene observed not to *Stirre* at all; And for the other part, to *Stirre*, but not to *Remove*. And they get *Warme* and *Close Places* to *Sleepe* in. When the *Flemmings* Wintred in *Nova Zembla*, the *Beares*, about the Middle of *November*, went to *Sleepe*; And then the *Foxes* began to come forth, which durst not before. It is noted by some of the *Ancients*, that the *Shee-Beare* breedeth, and lyeth in with her Young, during that time of *Rest*: And that a *Beare*, *Big* with *Young*, hath seldome beene seene.

Experiment Solitary, touching the *Generation* of *Creatures* by *Copulating*, and by *Putrefaction*.

900 SOme *Living Creatures* are Procreated by *Copulation* betweene *Male*, and *Female*: Some by *Putrefaction*; And of those which come by *Putrefaction*, many doe (nevertheless) afterwards procreate by *Copulation*. For the *Cause* of both *Generations*: First, it is most certaine, that the *Cause* of all *Vivification*, is a *Gentle* and *Proportionable Heat*, working upon a *Glutinous* and *Yeelding Substance*: For the *Heat* doth bring forth *Spirit* in that *Substance*: And the *Substance*, being *Glutinous*, produceth Two *Effects*: The One, that the *Spirit* is *Detained*, and cannot *Breake forth*: The Other, that the *Matter* being *Gentle*, and *Yeelding*, is driven forwards by the *Motion* of the *Spirits*, after some *Swelling* into *Shape*, and *Members*.

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Therefore all *Sperme*, all *Menſtruous Subſtance*, all *Matter* whereof *Creatures* are produced by *Putrefaction*, have evermore a *Cloſeneſſe*, *Lentour*, and *Sequacitie*. It ſeemeth therefore, that the *Generation* by *Sperme only*, and by *Putrefaction*, have two Different *Cauſes*. The firſt is, for that *Creatures*, which have a *Definite* and *Exact Shape*, (as thoſe have which are Procreated by *Copulation*,) cannot be produced by a *Weake*, and *Caſuall Heat*; Nor out of *Matter*, which is not *exactly Prepared*, according to the *Species*. The Second is, for that there is a greater *Time* required, for *Maturation* of *Perfect Creatures*; For if the *Time* required in *Vivification* be of any length, then the *Spirit* will Exhale, before the *Creature* be *Mature*: Except it be Encloſed in a *Place* where it may have *Continuance* of the *Heat*, *Acceſſe* of ſome *Nouriſhment* to maintaine it, and *Cloſeneſſe* that may keepe it from *Exhaling*. And ſuch *Places* are the *Wombs*, and *Matrices*, of the *Females*. And therefore all *Creatures*, made of *Putrefaction*, are of more *Vncertaine Shape*; And are made in *Shorter Time*; And need not ſo Perfect an *Encloſure*, though ſome *Cloſeneſſe* be commonly required. As for the *Heathen Opinion*, which was, that upon great *Mutations* of the *World*, *Perfect Creatures* were firſt Engendred of *Concretion*; As well as *Frogs*, and *Wormes*, and *Flies*, and ſuch like, are now; Wee know it to be vaine: But if any ſuch Thing ſhould be admitted, Diſcourſing according to *Senſe*, it cannot be, except you admit of a *Chaos* firſt, and *Commixture* of *Heauen* and *Earth*. For the *Frame* of the *World* once in Order, cannot effect it by any *Exceſſe*, or *Caſualtie*.

NATVRALL HISTORIE.

X. Century.

THe *Philosophie* of *Pythagoras*, (which was full of *Superstition*,) did first plant a *Monstrous Imagination*, Which afterwards was, by the *Schoole* of *Plato*, and Others, Watred, and Nourished. It was, that the *World* was *One*, *Entire*, *Perfect*, *Living Creature*; Insomuch as *Apollonius* of *Tyana*, a *Pythagorean Prophet*, affirmed, that the *Ebbing* and *Flowing* of the *Sea*, was the *Respiration* of the *World*, drawing in *Water* as *Breath*, and putting it forth againe. They went on, and inferred; That if the *World* were a *Living Creature*, it had a *Soule*, and *Spirit*; Which also they held, calling it *Spiritus Mundi*; The *Spirit* or *Soule* of the *World*: By which they did not intend *God*; (for they did admit of a *Deitie* besides;) But only

Experiments in Consort touching the *Transmission*, and *Influx*, of *Immateriate Vertues*, and the *Force* of *Imagination*.

only the *Soule*, or *Essentiall Forme* of the *Vniverse*. This *Foundation* being laid, they mought build upon it, what they would; For in a *Living Creature*, though never so great, (As for Example, in a great *Whale*,) the *Sense*, and the *Affects* of any one *Part* of the *Body*, instantly make a *Transcursion* thorowout the whole *Body*: So that by this they did insinuate, that no *Distance* of *Place*, nor *Want* or *Indisposition* of *Matter*, could hinder *Magicall Operations*; But that, (for Example,) wee mought here in *Europe*, have *Sense* and *Feeling* of that, which was done in *China*: And likewise, we mought worke any *Effect*, *without*, and *against Matter*: And this, not Holpen by the *Cooperation* of *Angels*, or *Spirits*, but only by the *Vnitie* and *Harmonie* of *Nature*. There were some also, that staid not here; but went further, and held; That if the *Spirit* of *Man*, (whom they call the *Microcosme*,) doe give a fit touch to the *Spirit* of the *World*, by strong *Imaginations*, and *Beleefes*, it might command *Nature*; For *Paracelsus*, and some darksom *Authors* of *Magicke*, doe ascribe to *Imagination Exalted*, the *Power* of *Miracle-working Faith*. With these Vast and Bottomelesse *Follies*, *Men* have been (in part) entertained.

But wee, that hold firme to the *Works* of *God*; And to the *Sense*, which is *Gods Lamp*; (*Lucerna Dei Spiraculum Hominis*;) will enquire, with all Sobrietie, and Severitie, whether there be to be found, in the Foot-steps of *Nature*, any such *Transmission* and *Influx* of *Immateriate Vertues*; And what the *Force* of *Imagination* is; Either upon the *Body Imaginant*, or upon another *Body*: Wherein it will be like that *Labour* of *Hercules*, in Purging the *Stable* of *Augeas*, to separate from *Superstitious*, and *Magicall Arts*, and *Observations*, any thing that is cleane, and pure *Naturall*; And not to be either Contemned, or Condemned. And although wee shall have occasion to speake of this in more Places than One, yet we will now make some Entrance thereinto.

Experiments in Consort, *Monitorie*, touching *Transmission* of *Spirits*, and the *Force* of *Imagination*.

MEn are to be Admonished, that they doe not with-draw Credit, from the *Operations* by *Transmission* of *Spirits*, & *Force* of *Imagination*, because the *Effects* faile *sometimes*. For as in *Infection*, and *Contagion* from *Body* to *Body*, (as the *Plague*, and the like,) it is most certaine, that

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the *Infection* is received (many times) by the *Body Passive*, but yet is by the *Strength*, and good *Disposition* thereof, Repulsed, and wrought out, before it formed into a *Disease*; So much more in *Impressions* from *Minde* to *Minde*, or from *Spirit* to *Spirit*, the *Impression* taketh but is Encountred, and Overcome, by the *Minde* and *Spirit*, which is *Passive*, before it worke any manifest *Effect*. And therefore, they worke most upon *Weake Mindes*, and *Spirits*: As those of *Women*; *Sicke Persons*; *Superstitious*, and *Fearfull Persons*; *Children*, and *Young Creatures*;

Nescio quis teneros Oculus mihi fascinat agnos:

The *Poet* speaketh not of *Sheepe*, but of *Lambs*. As for the *Weakenesse* of the *Power* of them, upon *Kings*, and *Magistrates*; It may be ascribed (besides the maine, which is the *Protection* of *God*, over those that Execute his Place,) to the *Weakenesse* of the *Imagination* of the *Imaginant*: For it is hard, for a *Witch*, or a *Sorcerer*, to put on a Beleefe, that they can hurt such *Persons*.

902 *Men* are to be Admonished, on the other side, that they doe not easily give Place and Credit to these *Operations*, because they *Succeed many times*; For the *Cause* of this *Successe*, is (oft) to be truly ascribed, unto the *Force* of *Affection* and *Imagination*, upon the *Body Agent*; And then by a *Secondarie Meanes*, it may worke upon a *Divers Body*: As for Example; If a *Man* carrie a *Planets Seale*, or a *Ring*, or some *Part* of a *Beast*, beleeving strongly, that it will help him to obtaine his *Love*; Or to keepe him from danger of hurt in *Fight*; Or to prevaile in a *Suit*; &c. it may make him more *Active*, and *Industrious*; And againe, more *Confident* and *Persisting*, than otherwise he would be. Now the great *Effects* that may come of *Industrie*, and *Perseverance*, (especially in *Civill Businesse*,) who knoweth not? For wee see *Audacitie* doth almost binde and mate the *weaker Sort* of *Minds*; And the *State* of *Humane Actions* is so variable, that to trie Things oft, and never to give over, doth Wonders: Therefore, it were a Meere *Fallacie* and *Mistaking*, to ascribe that to the *Force* of *Imagination*, upon another *Body*, which is but the *Force* of *Imagination* upon the Proper *Body*: For here is no doubt, but that *Imagination*, and *Vehement Affection*, worke greatly upon the *Body* of the *Imaginant*: As wee shall shew in due place.

903 *Men* are to be Admonished, that as they are not to mistake the *Causes* of these *Operations*; So, much lesse, they are to mistake the *Fact*, or *Effect*; And rashly to take that for done, which is not done. And therefore, as divers wise *Iudges* have prescribed, and cautioned, *Men* may not too rashly beleeve, the *Confessions* of *Witches*, nor yet the *Evidence* against them. For the *Witches* themselves are *Imaginative*, and beleeve oft-times, they doe that, which they doe not: And *People* are *Credulous* in that point, and ready to impute *Accidents*, and *Naturall Operations*, to *Witch-Craft*. It is worthy the Observing, that both in *Ancient*, and *Late times*; (As in the *Thessalian Witches*, and the Meetings of *Witches* that have beene recorded by so many late *Confessions*;) the great *Wonders* which they tell, of *Carrying* in the *Aire*; *Transforming* themselves into

other *Bodies*; &c. are ſtill reported to be wrought, not by *Incantations*, or *Ceremonies*; But by *Ointments*, and *Annointing* themſelves all over. This may juſtly move a *Man* to thinke, that theſe *Fables* are the *Effects* of *Imagination*: For it is certaine, that *Ointments* doe all, (if they be laid on any thing thicke,) by *Stopping* of the *Pores*, ſhut in the *Vapours*, and ſend them to the *Head* extremely. And for the Particular *Ingredients* of thoſe *Magicall Ointments*, it is like they are *Opiate*, and *Soporiferous*. For *Annointing* of the *Fore-head*, *Necke*, *Feet*, *Back-Bone*, we know is uſed for Procuring *Dead Sleepes*: And if any *Man* ſay, that this *Effect* would be better done by Inward *Potions*; Anſwer may be made, that the *Medicines*, which goe to the *Ointments*, are ſo ſtrong, that if they were uſed inwards, they would kill thoſe that uſe them: And therefore they worke Potently, though Outwards.

We will divide the Severall Kindes of the *Operations*, by *Tranſmiſſion* of *Spirits*, and *Imagination*; Which will give no ſmall Light to the *Experiments* that follow. All *Operations* by *Tranſmiſſion* of *Spirits*, and *Imagination* have this; That they *Worke* at *Diſtance*, and not at *Touch*; And they are theſe being diſtinguiſhed.

904 The Firſt is the *Tranſmiſſion* or *Emiſſion*, of the *Thinner*, and more *Airie Parts* of *Bodies*; As in *Odours*, and *Infections*; And this is, of all the reſt, the moſt *Corporeall*. But you muſt remember withall, that there be a Number of thoſe *Emiſſions*, both *Wholeſome*, and *Vnwholſome*, that give no *Smell* at all: For the *Plague*, many times, when it is taken, giveth no *Sent* at all: And there be many *Good* and *Healthfull Aires*, that doe appeare by *Habitation*, and other Proofes, that differ not in *Smell* from other *Aires*. And under this Head, you may place all *Imbibitions* of *Aire*, where the *Subſtance* is *Materiall*, *Odour-like*; Whereof ſome nevertheleſſe are ſtrange, and verie ſuddenly diffuſed; As the *Alteration*, which the *Aire* receiveth in *Ægypt*, almoſt immediately, upon the *Riſing* of the *River* of *Nilus*, whereof we have ſpoken.

905 The Second is the *Tranſmiſſion* or *Emiſſion* of thoſe *Things* that wee call *Spirituall Species*; As *Viſibles*, and *Sounds*: The one whereof wee have handled; And the other we ſhall handle in due place. Theſe move ſwiftly, and at great diſtance; But then they require a *Medium* well diſpoſed; And their *Tranſmiſſion* is eaſily ſtopped.

906 The Third is the *Emiſſions*, which cauſe *Attraction* of *Certaine Bodies* at *Diſtance*; Wherein though the *Loadſtone* be commonly placed in the Firſt Ranke, yet we thinke good to except it, and referre it to another *Head*: but the *Drawing* of *Amber*, and *Iet*, and other *Electricke Bodies*; And the *Attraction* in *Gold* of the *Spirit* of *Quick-Silver*, at diſtance; And the *Attraction* of *Heat* at diſtance; And that of *Fire* to *Naphtha*; And that of ſome *Herbs* to *Water*, though at diſtance; And divers others; We ſhall handle, but yet not under this preſent *Title*, but under the *Title* of *Attraction* in generall.

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907 The Fourth is the *Emission* of *Spirits*, and *Immateriate Powers* and *Vertues*, in those Things, which worke by the *Vniversall Configuration*, and *Sympathy* of the *World*; Not by *Formes*, or *Celestiall Influxes*, (as is vainly taught and received,) but by the *Primitive Nature* of *Matter*, and the *Seeds* of *Things*. Of this kinde is, (as we yet suppose,) the *Working* of the *Load-Stone*, which is by *Consent* with the *Globe* of the *Earth*: Of this Kinde is the *Motion* of *Gravitie*, which is by *Consent* of *Dense Bodies*, with the *Globe* of the *Earth*: Of this kinde is some *Disposition* of *Bodies* to *Rotation*, and particularly from *East* to *West*: Of which kinde we conceive the *Maine Float* and *Re-float* of the *Sea* is, which is by *Consent* of the *Vniverse*, as Part of the *Diurnall Motion*. These *Immateriate Vertues* have this Propertie differing from Others; That the *Diversitie* of the *Medium* hindreth them not; But they passe through all *Mediums*; yet at *Determinate Distances*. And of these wee shall speake, as they are incident to severall *Titles*.

908 The Fifth is the *Emissions* of *Spirits*; And this is the Principall in our Intention to handle now in this Place: Namely, the *Operation* of the *Spirits* of the *Minde* of *Man*, upon other *Spirits*: And this is of a *Double Nature*: The *Operations* of the *Affections*, if they be Vehement; And the *Operation* of the *Imagination*, if it be Strong. But these two are so *Coupled*, as wee shall handle them together: For when an *Envious*, or *Amorous Aspect*, doth infect the *Spirits* of Another, there is Joyned both *Affection*, and *Imagination*.

909 The Sixth is, the Influxes of the *Heavenly Bodies*, besides those two Manifest Ones, of *Heat*, and *Light*. But these we will handle, where we handle the *Celestiall Bodies*, and *Motions*.

910 The Seventh is the *Operations* of *Sympathy*; Which the *Writers* of *Naturall Magicke* have brought into an *Art*, or *Precept*: And it is this; That if you desire to Super-induce, any *Vertue* or *Disposition*, upon a *Person*, you should take the *Living Creature*, in which that *Vertue* is most *Eminent*, and in *Perfection*: Of that *Creature* you must take the *Parts*, wherein that *Vertue* chiefly is *Collocate*: Againe, you must take those *Parts*, in the *Time*, and *Act*, when that *Vertue* is most in *Exercise*; And then you must apply it to that *Part* of *Man*, wherein that *Vertue* chiefly *Consisteth*. As if you would Super-induce *Courage* and *Fortitude*, take a *Lion*, or a *Cock*; And take the *Heart*, *Tooth*, or *Paw* of the *Lion*; Or the *Heart*, or *Spurre* of the *Cocke*: Take those *Parts* immediately after the *Lion*, or the *Cocke* have beene in *Fight*; And let them be worne, upon a *Mans Heart*, or *Wrest*. Of these and such like *Sympathies*, we shall speake under this present *Title*.

911 The Eighth and last is, an *Emission* of *Immateriate Vertues*; Such as we are a little doubtfull to Propound; It is so prodigious: But that it is so constantly avouched by many: And wee have set it downe, as a Law to our Selves, to examine things to the Bottome; And not to receive upon Credit, or reject upon Improbabilities, untill there hath passed a due Examination. This is, the *Sympathy* of *Individuals*: For as there

there is a *Sympathy* of *Species*; So, (it may be) there is a *Sympathy* of *Individuals*: That is, that in *Things*, or the *Parts* of *Things* that have been once *Contiguous*, or *Entire*, there should remaine a *Transmission* of *Vertue*, from the One to the Other: As betweene the *Weapon*, and the *Wound*. Whereupon is blazed abroad the *Operation* of *Unguentum Tali*: And so of a *Peece* of *Lard*, or *Sticke* of *Elder*, &c. that if *Part* of it be Consumed or Putrified, it will worke upon the other *Part Severed*. Now wee will pursue the *Instances* themselves.

Experiments in Consort touching *Emission* of *Spirits* in *Vapour*, or *Exhalation*, *Odour-like*.

912 THe *Plague* is many times taken without *Manifest Sense*, as hath been said. And they report, that where it is found, it hath a Sent of the *Smell* of a *Mellow Apple*; And (as some say) of *May Flowers*: And it is also received, that *Smells* of *Flowers*, that are *Mellow* and *Lushious*, are ill for the *Plague*; As *White Lillies*, *Cowslips*, and *Hyacinths*.

913 The *Plague* is not easily received by such, as continually are about them, that have the *Plague*; As *Keepers* of the *Sicke*, and *Physitians*; Nor againe by such as take *Antidotes*, either Inward, (as *Mithridate*; *Iuniper-Berries*; *Rue*, *Leafe* and *Seed*; &c.) Or Outward, (as *Angelica*, *Zedoarie*, and the like, in the Mouth; *Tarre*, *Galbanum*, and the like, in Perfume.) Nor againe by *Old People*, and such as are of a *Dry* and *Cold Complexion*. On the other side, the *Plague* taketh soonest hold of those, that come out of a *Fresh Aire*; And of those that are *Easting*; And of *Children*; And it is likewise noted to goe in a *Bloud*, more than to a *Stranger*.

914 The most Pernicious *Infection*, next the *Plague*, is the *Smell* of the *Iayle*; When *Prisoners* have beene Long, and Close, and Nastily kept; Whereof we have had, in our time, Experience, twice or thrice, when both the *Iudges* that sate upon the *Iayle*, and *Numbers* of those that attended the Businesse, or were present, *sickned* upon it, and *Died*. Therefore it were good wisdome, that in such Cases, the *Iayle* were Aired, before they be brought forth.

915 Out of question, if such *Foule Smells* be made by *Art*, and by the Hand, they consist chiefly of *Mans Flesh*, or *Sweat*, *Putrified*; For they are not those *Stinks*, which the *Nosthrils* straight abhorre, and expell, that are most *Pernicious*; But such *Aires*, as have some Similitude with *Mans Body*; And so insinuate themselves, and betray the *Spirits*. There may be great danger in using such Compositions, in great Meetings of People, within Houses; As in *Churches*; At *Arraignments*; At *Playes* and *Solemnities*; And the like; For *Poysoning* of *Aire* is no lesse dangerous than *Poysoning* of *Water*; Which hath beene used by the *Turks* in the Warres; And was used by *Emanuel Comnenus* towards the *Christians*, when they passed thorow his *Countrey* to the *Holy Land*. And these *Empoysonments* of *Aire*, are the more dangerous in *Meetings* of *People*; Because the much *Breath* of *People*, doth further the *Reception* of the *Infection*: And therefore, where any such Thing is feared, it were good, those *Publique Places* were perfumed, before the *Assemblies*.

916 The *Empoysonment* of Particular *Persons*, by *Odours*, hath beene reported

ported to be in *Perfumed Gloves*, or the like: And it is like, they Mingle the *Poyson* that is deadly, with some *Smels* that are Sweet, which also maketh it the sooner received. *Plagues* also have been raised by *Annointings* of the *Chincks* of *Doores*, and the like; Not so much by the Touch, as for that it is common for *Men*, when they finde any thing Wet upon their Fingers, to put them to their *Nose*; Which Men therefore should take heed how they doe. The best is, that these *Compositions* of *Infectious Aires*, cannot be made without *Danger* of *Death*, to them that make them. But then againe, they may have some *Antidotes* to save themselues; So that *Men* ought not to be secure of it.

There have beene, in divers *Countries*, great *Plagues*, by the *Putrefaction*, of great *Swarmes* of *Grasse-Hoppers*, and *Locusts*, when they have beene dead, and cast upon Heaps. 917

It happeneth oft in *Mines*, that there are *Damps*, which kill, either by *Suffocation*, or by the *Poysonous Nature* of the *Minerall*: And those that deale much in *Refining*, or other Works about *Metals*, and *Minerals*, have their *Braines* Hurt & Stupefied by the *Metalline Vapours*. Amongst which, it is noted, that the *Spirits* of *Quick-Silver*, ever flie to the *Skull*, *Teeth*, or *Bones*; In so much as *Gilders* use to have a Peece of *Gold* in their *Mouth*, to draw the *Spirits* of the *Quick-Silver*; Which *Gold* afterwards they finde to be Whitened. There are also certaine *Lakes*, and *Pits*, such as that of *Avernus*, that *Poyson Birds*, (as is said,) which fly over them; Or *Men*, that stay too long about them. 918

The *Vapour* of *Char-Coale*, or *Sea-Coale*, in a Close Roome, hath killed many: And it is the more dangerous, because it commeth without any *Ill Smell*; But stealeth on by little & little; Enducing only a *Faintenesse*, without any *Manifest Strangling*. When the *Dutch-Men* Wintred at *Nova Zembla*, and that they could gather no more Sticks, they fell to make Fire of some *Sea-Coale* they had, wherewith (at first) they were much refreshed; But a little after they had sit about the *Fire*, there grew a Generall Silence, and lothnesse to speake amongst them; And immediately after, One of the *Weakest* of the *Company*, fell downe in a Swoune; Whereupon they doubting what it was, opened their doore, to let in *Aire*, and so saved themselves. The *Effect* (no doubt) is wrought by the *Inspissation* of the *Aire*; And so of the *Breath*, and *Spirits*. The like ensueth in *Roomes* newly *Plaistered*, if a *Fire* be made in them; Whereof no lesse *Man* than the *Emperour Iovinianus* Died. 919

Vide the *Experiment*, 803. touching the *Infectious Nature* of the *Aire*, upon the First *Showers*, after long *Drought*. 920

It hath come to passe, that some *Apothecaries*, upon *Stamping* of *Coloquintida*, have beene put into a great *Skouring*, by the *Vapour* onely. 921

It hath beene a Practice, to burne a *Pepper*, they call *Ginny-Pepper*; Which hath such a strong *Spirit*, that it provoketh a *Continuall Sneezing*, in those that are in the *Roome*. 922

It is an *Ancient Tradition*, that *Bleare-Eyes* infect *Sound-Eyes*; And that a *Menstruous Woman*, looking upon a *Glasse*, doth rust it. Nay they have 923

have an *Opinion*, which seemeth *Fabulous*; That *Menstruous Women*, going over a *Field*, or *Garden*, doe *Corne* and *Herbs* good by *Killing* the *Wormes*.

924 The *Tradition* is no lesse *Ancient*, that the *Basiliske* killeth by *Aspect*; And that the *Wolfe*, if hee see a *Man* first, by *Aspect* striketh a *Man* hoarse.

925 *Perfumes* Convenient doe drie and strengthen the *Braine*; And stay *Rheumes* and *Defluxions*; As we finde in *Fume* of *Rose-Marie* dried, and *Lignum Aloës*, and *Calamus*, taken at the *Mouth*, and *Nosthrils*; And no doubt there be other *Perfumes*, that doe moisten, and refresh; And are fit to be used in *Burning Agues*, *Consumptions*, and too much *Wakefulnesse*; Such as are, *Rose-Water*, *Vinegar*, *Limon-Pills*, *Violets*, the *Leaves* of *Vines* sprinckled with a little *Rose-Water*, &c.

926 They doe use in *Sudden Faintings*, and *Swounings*, to put a *Handkerchiefe* with *Rose-Water*, or a *Little Vinegar*, to the *Nose*; Which gathereth together againe the *Spirits*, which are upon point to resolve, and fall away.

927 *Tobacco* comforteth the *Spirits*, and dischargeth *Wearinesse*; Which it worketh partly by Opening; But chiefly by the *Opiate Vertue*, which condenseth the *Spirits*. It were good therefore to trie the *Taking* of *Fumes* by *Pipes*, (as they doe in *Tobacco*,) of other *Things*; As well to drie, and comfort, as for other *Intentions*. I wish Triall be made of the *Drying Fume*, of *Rose-Marie*, and *Lignum Aloës*, before mentioned, in *Pipe*; And so of *Nutmeg*, and *Folium Indum*; &c.

928 The *Following* of the *Plough*, hath beene approved, for *Refreshing* the *Spirits*, and *Procuring Appetite*: But to doe it in the *Ploughing* for *Wheat*, or *Rye*, is not so good; Because the *Earth* hath spent her Sweet *Breath*, in *Vegetables*, put forth in *Summer*. It is better therefore to doe it, when you sow *Barley*. But because Ploughing is tied to *Seasons*, it is best to take the *Aire* of the *Earth*, new turned up, by *Digging* with the *Spade*; Or *Standing* by him that *Diggeth*. *Gentlewomen* may doe themselves much good by kneeling upon a Cushion, and *Weeding*. And these Things you may practise in the best *Seasons*; Which is ever the *Early Spring*, before the *Earth* putteth forth the *Vegetables*; And in the *Sweetest Earth* you can chuse. It would be done also, when the *Dew* is a little off the *Ground*, lest the *Vapour* be too Moist. I knew a great *Man*, that lived Long, who had a Cleane *Clod* of *Earth*, brought to him everie *Morning*, as hee sate in his *Bed*; And hee would hold his *Head* over it, a good while. I commend also, sometimes, in *Digging* of *New Earth*, to poure in some *Malmesey*, or *Greeke Wine*; That the *Vapour* of the *Earth*, and *Wine* together, may comfort the *Spirits*, the more; Provided alwayes, it be not taken, for a *Heathen Sacrifice*, or *Libation* to the *Earth*.

929 They have, in *Physicke*, Use of *Pomanders*, and *Knots* of *Powders*, for *Drying* of *Rheumes*, *Comforting* of the *Heart*, *Provoking* of *Sleepe*, &c. For though those *Things* be not so Strong as *Perfumes*, yet you may have them continually in your *Hand*; whereas *Perfumes* you can take but at

Times;

Times, And beſides, there be divers *Things*, that breath better of themſelves, than when they come to the *Fire*; As *Nigella Romana*; the *Seed* of *Melanthium*, *Amomum*, &c.

There be two *Things*, which (inwardly uſed) doe Coole and condenſe the *Spirits*; And I wiſh the ſame to be tried outwardly in *Vapours*. The One is *Nitre*, which I would have diſſolved in *Malmeſey*, or *Greeke-Wine*, and ſo the *Smell* of the *Wine* taken; Or if you would have it more forcible, poure of it upon a *Fire-pan*, well heated, as they doe *Roſe-Water*, and *Vinegar*. The other is, the *Diſtilled Water* of *Wilde Poppy*; which I wiſh to be mingled, at halfe, with *Roſe-Water*, and ſo taken with ſome *Mixture* of a few *Cloves*, in a *Perfuming-Pan*. The like would be done with the *Diſtilled Water* of *Saffron Flowers*. 930

Smells of *Muske*, and *Amber*, and *Civit*, are thought to further *Venereous Appetite*: Which they may doe by the *Refreſhing* and *Calling forth* of the *Spirits*. 931

Incenſe, and *Nidorous Smells*, (ſuch as were of *Sacrifices*,) were thought to Intoxicate the *Braine*, and to diſpoſe *Men* to *Devotion*: Which they may doe, by a kinde of *Sadneſſe*, and *Contriſtation* of the *Spirits*: And partly alſo by *Heating*, and *Exalting* them. Wee ſee, that amongſt the *Iewes*, the *Principall Perfume* of the *Sanctuarie*, was forbidden all *Common Vſes*. 932

There be ſome *Perfumes*, preſcribed by the *Writers* of *Naturall Magicke*, which procure *Pleaſant Dreames*; And ſome others, (as they ſay,) that procure *Propheticall Dreames*; As the *Seeds* of *Flax*, *Fleawort*, &c. 933

It is certaine, that *Odours* doe, in a ſmall Degree, Nouriſh; Eſpecially the *Odour* of *Wine*: And we ſee *Men* an hungred, doe love to ſmell *Hot Bread*. It is related, that *Democritus*, when he lay a dying, heard a *Woman*, in the Houſe, complaine, that ſhee ſhould be kept from being at a *Feaſt*, and *Solemnitie*, (which ſhee much deſired to ſee,) becauſe there would be a *Corps* in the Houſe; Whereupon hee cauſed *Loaves* of *New Bread* to be ſent for, and opened them; And powred a little *Wine* into them; And ſo kept himſelfe alive with the *Odour* of them, till the *Feaſt* was paſt. I knew a *Gentleman*, that would faſt (ſometimes) three or foure, yea five dayes, without *Meat*, *Bread*, or *Drinke*; But the ſame *Man* uſed to have continually, a great *Wiſp* of *Herbs*, that hee ſmelled on: And amongſt thoſe *Herbs*, ſome *Eſculent Herbs* of ſtrong *Sent*; As *Onions*, *Garlicke*, *Leekes*, and the like. 934

They doe uſe, for the *Accident* of the *Mother*, to burne *Feathers*, and other *Things* of *Ill Odour*: And by thoſe *Ill Smells*, the *Riſing* of the *Mother* is put downe. 935

There be *Aires*, which the *Phyſitians* adviſe their *Patients* to remove unto, in *Conſumptions*, or upon *Recoverie* of *Long Sickneſſes*: Which (commonly) are *Plaine Champaignes*, but *Graſing*, and not Over-growne with *Heath*, or the like: Or elſe *Timber-Shades*, as in *Forreſts*, and the like. It is noted alſo, that *Groves* of *Bayes* doe forbid *Peſtilent Aires*; Which was 936

accounted

accounted a great *Cause* of the Wholesome *Aire* of *Antiochia*. There be also some *Soyles* that put forth *Odorate Herbs* of themselves; As *Wilde Thyme*; *Wilde Marjoram*; *Penny-Royall*; *Camomill*; And in which the *Briar-Roses* smell almost like *Muske-Roses*; Which (no doubt) are *Signes* that doe discover an *Excellent Aire*.

937 It were good for *Men*, to thinke of having *Healthfull Aire*, in their *Houses*; Which will never be, if the *Roomes* be *Low-roofed*, or full of *Windowes*, and *Doores*; For the one maketh the *Aire Close*, and not *Fresh*; And the other maketh it Exceeding *Unequall*; Which is a great Enemie to *Health*. The *Windowes* also should not be high up to the *Roofe*, (which is in use for Beautie, and Magnificence,) but Low. Also *Stone-Walls* are not wholesome; But *Timber* is more wholesome; And especially *Brick*. Nay it hath beene used by some, with great Successe, to make their *Walls* thicke; And to put a Lay of *Chalke* betweene the *Bricks*, to take away all *Dampishnesse*.

Experiment Solitary, touching the *Emissions* of *Spirituall Species* which *Affect* the *Senses*.

938 THese *Emissions*, (as wee said before,) are handled, and ought to be handled, by themselves, under their *Proper Titles*: That is, *Visibles*, and *Audibles*, each a-part: In this Place, it shall suffice to give some generall *Observations*, Common to both. First, they seeme to be *Incorporeall*. Secondly, they Worke *Swiftly*. Thirdly, they Worke at *Large Distances*. Fourthly, in *Curious Varieties*. Fifthly, they are not *Effective* of any *Thing*; Nor leave no *Work* behind them; But are *Energies* meerely; For their *Working* upon *Mirrours*, and *Places* of *Echo*, doth not alter any Thing in those *Bodies*; But it is the same *Action* with the *Originall*, onely *Repercussed*. And as for the *Shaking* of *Windowes*, or *Rarefying* the *Aire* by *Great Noyses*; And the *Heat* caused by *Burning-Glasses*; They are rather *Concomitants* of the *Audible*, and *Visible Species*, than the *Effects* of them. Sixthly, they seeme to be of so *Tender*, and *Weake* a *Nature*, as they affect onely such a Rare, and Attenuate *Substance*, as is the *Spirit* of *Living Creatures*.

Experiments in Consort, touching the *Emission* of *Immateriate Vertues* from the *Mindes*, and *Spirits* of *Men*, either by *Affections*, or by *Imaginations*, or by other *Impressions*.

939 IT is mentioned in some *Stories*, that where *Children* have beene *Exposed*, or taken away young from their *Parents*; And that afterwards they have approached to their *Parents* presence, the *Parents*, (though they have not knowne them,) have had a *Secret Ioy*, or Other *Alteration* thereupon.

940 There was an *Ægyptian South-Sayer*, that made *Anthonius* beleeve, that his *Genius*, (which otherwise was *Brave*, and *Confident*,) was, in the Presence of *Octavianus Cæsar*, *Poore*, and *Cowardly*: And therefore, he advised him, to absent himselfe, (as much as he could,) and remove far from him. This *South-Sayer* was thought to be suborned by *Cleopatra*, to make him live in *Ægypt*, and other Remote *Places* from *Rome*. Howsoever the Conceit of a *Predominant* or *Mastering Spirit*, of one *Man* over Another, is Ancient, and Received still, even in *Vulgar Opinion*.

There

941 There are Conceits, that ſome *Men*, that are of an *Ill*, and *Melancholy Nature*, doe incline the *Company*, into which they come, to be *Sad*, and *Ill diſpoſed*; And contrariwiſe, that Others, that are of a *Iouiall Nature*, doe diſpoſe the *Company to be Merrie* and *Cheerefull*. And againe, that ſome *Men* are *Luckie* to be *kept Company* with, and *Employed*; And Others *Vnluckie*. Certainly, it is agreeable to *Reaſon*, that there are, at the leaſt, ſome *Light Effluxions* from *Spirit* to *Spirit*, when *Men* are in *Preſence* one with another, as well as from *Body* to *Body*.

942 It hath been obſerved, that *Old Men*, who have loved *Young Company*, and beene Converſant continually with them, have beene of *Long Life*; Their *Spirits*, (as it ſeemeth,) being Recreated by ſuch *Company*. Such were the *Ancient Sophiſts*, and *Rhetoricians*; Which ever had *Young Auditours*, and *Diſciples*; As *Gorgias*, *Protagoras*, *Iſocrates*, &c. Who liued till they were an Hundred yeares Old. And ſo likewiſe did many of the *Grammarians*, and *Schoole-Maſters*; ſuch as was *Orbilius*, &c.

943 *Audacitie* and *Confidence* doth, in Civill Buſineſſe, ſo great Effects, as a *Man* may (reaſonably) doubt, that beſides the verie *Daring*, and *Earneſtneſſe*, and *Perſiſting*, and *Importunitie*, there ſhould be ſome *Secret Binding*, and *Stooping* of other *Mens Spirits*, to ſuch *Perſons*.

944 The *Affections* (no doubt) doe make the *Spirits* more *Powerfull*, and *Active*; And eſpecially thoſe *Affections*, which draw the *Spirits* into the *Eyes*: Which are two: *Loue*, and *Envie*, which is called *Oculus Malus*. As for *Loue*, the *Platoniſts*, (ſome of them,) goe ſo farre, as to hold that the *Spirit* of the *Lover*, doth paſſe into the *Spirits*, of the *Perſon Loued*; Which cauſeth the deſire of Returne into the *Body*, whence it was *Emitted*: Whereupon followeth that *Appetite* of *Contract*, and *Conjunction*, which is in *Lovers*. And this is obſerved likewiſe, that the *Aſpects* that procure *Loue*, are not *Gazings*, but *Sudden Glances*, and *Dartings* of the *Eye*. As for *Envie*, that emitteth ſome *Maligne* and *Poyſonous Spirits*, which taketh hold of the *Spirit* of Another; And is likewiſe of greateſt Force, when the *Caſt* of the *Eye* is *Oblique*. It hath beene noted alſo, that it is moſt Dangerous, when an *Envious Eye* is caſt upon *Perſons* in *Glory*, and *Triumph*, and *Ioy*. The *Reaſon* whereof is, for that, at ſuch times, the *Spirits* come forth moſt, into the *Outward Parts*, and ſo meet the *Percuſſion* of the *Envious Eye*, more at *Hand*: And therefore it hath beene noted, that after great *Triumphs*, *Men* have beene ill diſpoſed, for ſome Dayes following. Wee ſee the Opinion of *Faſcination* is Ancient, for both *Effects*; Of Procuring *Loue*; And *Sickneſſe* cauſed by *Envie*: And *Faſcination* is ever by the *Eye*. But yet if there be any ſuch *Infection* from *Spirit* to *Spirit*, there is no doubt, but that it worketh by *Preſence*, and not by the *Eye* alone; Yet moſt Forcibly by the *Eye*.

945 *Feare*, and *Shame*, are likewiſe *Infective*; For wee ſee that the *Starting* of one will make another ready to *Start*: And when one *Man* is out of *Countenance* in a *Company*, others doe likewiſe *Bluſh* in his behalfe.

Now wee will ſpeake of the *Force* of *Imagination* upon other *Bodies*; And of the *Meanes* to *Exalt* and *Strengthen* it. *Imagination*, in this Place, I underſtand to be, the *Repreſentation* of an *Individuall Thought*. *Imagination* is of three Kinds: The Firſt *Joyned* with *Beleefe* of that which is to *Come*: The Second *Joyned* with *Memorie* of that which is *Paſt*; And the Third is of *Things Preſent*, or as if they were *Preſent*; For I comprehend in this, *Imaginations Faigned*, and at *Pleaſure*; As if one ſhould *Imagine* ſuch a *Man* to be in the *Veſtments* of a *Pope*; Or to have *Wings*. I ſingle out, for this time, that which is with *Faith*, or *Beleefe* of that which is to *Come*. The *Inquiſition* of this *Subject*, in our way, (which is by *Induction*,) is wonderfull hard; for the *Things* that are reported, are full of *Fables*; And *New Experiments* can hardly be made, but with Extreme Caution, for the Reaſon which we will hereafter declare.

The *Power* of *Imagination* is in three Kindes; The Firſt, upon the *Body* of the *Imaginant*; Including likewiſe the *Child* in the *Mothers Womb*; The Second is, the *Power* of it upon *Dead Bodies*, as *Plants*, *Wood*, *Stone*, *Metall*, &c. The Third is, the *Power* of it, upon the *Spirits* of *Men*, and *Living Creatures*; And with this laſt we will onely meddle.

The *Probleme* therefore is, whether a *Man Conſtantly* and *Strongly Beleeving*, that ſuch a *Thing* ſhal be; (As that ſuch an *One* will *Love Him*; Or that ſuch an *One* will *Grant Him* his *Requeſt*; Or that ſuch an *One* ſhall *Recover* a *Sickneſſe*; Or the like;) It doth help any thing to the *Effecting* of the *Thing* it ſelfe. And here againe we muſt warily diſtinguiſh; For it is not meant, (as hath beene partly ſaid before,) that it ſhould help by *Making* a *Man* more *Stout*, or more *Induſtrious*; (In which kinde a *Conſtant Beleefe* doth much;) But meerely by a *Secret Operation*, or *Binding*, or *Changing* the *Spirit* of *Another*: And in this it is hard (as we began to ſay,) to make any *New Experiment*; For I cannot *command* my Selfe to *Beleeve* what I will, and ſo no *Triall* can be made. Nay it is worſe; For whatſoever a *Man Imagineth doubtingly*, or with *Feare*, muſt needs doe hurt, if *Imagination* have any *Power* at all;

For

For a *Man* repreſenteth that oftner, that hee feareth, than the contrarie.

The Help therefore is, for a *Man* to worke by *Another*, in whom he may Create *Beleefe*, and not by *Himſelfe*; Untill *Himſelfe* have found by *Experience*, that *Imagination* doth prevaile; For then *Experience* worketh in *Himſelfe Beleefe*; If the *Beleefe*, that ſuch a *Thing* ſhall be, be joyned with a *Beleefe*, that his *Imagination* may procure it.

For Example; I related one time to a *Man*, that was Curious, and Vaine enough in theſe Things; *That I ſaw a Kinde of* Iuggler, *that had a* Paire *of* Cards, *and would tell a* Man *what* Card *he thought*. This Pretended Learned Man told mee; It was a Miſtaking in Mee; *For* (*ſaid hee*) *it was not the* Knowledge *of the* Mans Thought, (*for that is Proper to* God,) *but it was the* Inforcing *of a* Thought *upon him, and* Binding *his* Imagination *by a* Stronger, *that hee could* Thinke no other *Card*. And thereupon he asked me a *Queſtion*, or two, which I thought he did but cunningly, knowing before what uſed to be the *Feats* of the *Iuggler*. *Sir*, (*ſaid hee*,) *doe you remember whether hee told the* Card, *the* Man *thought*, Himſelfe, *or bade* Another *to tell it*. I anſwered (as was true;) *That he bade Another tell it*. Whereunto he ſaid; *So I thought*: *For* (*ſaid he*) *Himſelfe could not have put on ſo ſtrong an* Imagination; *But by telling the other the* Card, (*who beleeved that the* Iuggler *was ſome Strange* Man, *and could doe Strange* Things,) *that other* Man *caught a ſtrong* Imagination. I harkened unto him, thinking for a Vanitie he ſpoke prettily. Then he asked me another *Queſtion*: Saith he; *Doe you remember, whether he bade the* Man *thinke the* Card *firſt, and afterwards told the other* Man *in his Eare, what he ſhould thinke, Or elſe that he did whiſper firſt in the* Mans *Eare, that ſhould tell the* Card, *telling that ſuch a* Man *ſhould thinke ſuch a* Card, *and after bade the* Man *thinke a* Card? I told him, as was true; *That he did firſt whiſper the* Man *in the Eeare, that ſuch a* Man *ſhould thinke ſuch a* Card: Upon this the *Learned Man* did much Exult, and Pleaſe himſelfe, ſaying; *Loe, you may ſee that my* Opinion *is right*: *For if the* Man *had thought firſt*, *his* Thought *had beene Fixed*; *But the other* Imagining *firſt*, *bound his* Thought. Which though it did ſomewhat ſinke with me, yet I made it Lighter than I thought, and ſaid; *I thought it was* Confederacie, *betweene the* Iuggler, *and the two* Servants: Though (indeed) I had no Reaſon ſo to thinke: For they were both my *Fathers* Servants; And hee had never plaid in the Houſe before. The *Iuggler* alſo did cauſe a *Garter* to be held up; And tooke upon him, to know, that ſuch an *One*, ſhould point in ſuch a *Place*, of the *Garter*; As it ſhould be neare ſo many *Inches* to the *Longer End*, and ſo many to the *Shorter*; And ſtill he did it, by *Firſt Telling* the *Imaginer*, and after *Bidding* the *Actour Thinke*.

Having told this *Relation*, not for the Weight thereof, but

becauſe it doth handſomely open the *Nature* of the *Queſtion*, I returne to that I ſaid; That *Experiments* of *Imagination*, muſt be practiſed by Others, and not by a *Mans* Selfe. For there be Three *Meanes* to fortifie *Beleefe*: The First is *Experience*: The Second is *Reaſon*: And the Third is *Authoritie*: And that of theſe, which is farre the moſt *Potent*, is *Authoritie*: For *Beleefe* upon *Reaſon*, or *Experience*, will Stagger.

947 For *Authoritie*, it is of two Kindes; *Beleefe* in an *Art*; And *Beleefe* in a *Man*. And for Things of *Beleefe* in an *Art*; A *Man* may exerciſe them by *Himſelfe*; But for *Beleefe* in a *Man*, it muſt be by *Another*. Therefore, if a *Man* beleeve in *Aſtrologie*, and finde a *Figure* Proſperous; Or beleeve in *Naturall Magicke*, and that a *Ring* with ſuch a *Stone*, or ſuch a *Peece* of a *Living Creature*, Carried, will doe good; It may help his *Imagination*: But the *Beleefe* in a *Man* is farre the more *Active*. But howſoever, all *Authoritie* muſt be out of a *Mans Selfe*, turned (as was ſaid,) either upon an *Art*, or upon a *Man*: And where *Authoritie* is from one *Man* to another, there the Second muſt be *Ignorant*, and not *Learned*, or *Full* of *Thoughts*; And ſuch are (for the moſt part) all *Witches*, and *Superſtitious Perſons*; Whoſe *Beleefes*, tied to their *Teachers*, and *Traditions*, are no whit controlled, either by *Reaſon*, or *Experience*: And upon the ſame Reaſon, in *Magicke*, they uſe (for the moſt part,) *Boyes*, and *Young People*; whoſe *Spirits* eaſilieſt take *Beleefe*, and *Imagination*.

Now to fortifie *Imagination*, there be three wayes: The *Authoritie* whence the *Beleefe* is derived; *Meanes* to *Quicken* and *Corroborate* the *Imagination*; And *Meanes* to *Repeat* it, and *Refreſh* it.

948 For the *Authoritie*, wee have already ſpoken: As for the Second; Namely the *Meanes* to *Quicken*, and *Corroborate* the *Imagination*; We ſee what hath been uſed in *Magick*; (If there be in thoſe Practiſes any thing that is purely *Naturall*;) As *Veſtments*; *Characters*; *Words*; *Seales*; Some *Parts* of *Plants*, or *Living Creatures*; *Stones*; *Choice* of the *Houre*; *Geſtures* and *Motions*; Alſo *Incenſes*, and *Odours*; *Choice* of *Societie*, which increaſeth *Imagination*; *Diets* and *Preparations* for ſome time before. And for *Words*, there have beene ever uſed, either *Barbarous Words*, of no Senſe, leſt they ſhould diſturb the *Imagination*; Or *Words* of *Similitude*, that may ſecond and feed the *Imagination*: And this was ever as well in *Heathen Charmes*, as in *Charmes* of latter Times. There are uſed alſo *Scripture-Words*; For that the *Beleefe*, that *Religious Texts*, and *Words*, have Power, may ſtrengthen the *Imagination*. And for the ſame Reaſon, *Hebrew Words*, (which amongſt us is counted the *Holy Tongue*, and the *Words* more *Myſticall*,) are often uſed.

949 For the *Refreſhing* of the *Imagination*, (which was the Third *Meanes* of *Exalting* it;) We ſee the Practices of *Magicke*, as in *Images* of *Wax*,

and

and the like, that should Melt by little, and little; Or some other *Things Buried* in *Mucke*, that should Putrifie by little and little; Or the like: For so oft as the *Imaginant* doth thinke of those Things, so oft doth he represent to his *Imagination*, the *Effect* of that he desireth.

950 If there be any *Power* in *Imagination*, it is lesse credible, that it should be so *Incorporeall* and *Immateriate a Vertue*, as to worke at great *Distances*; Or through all *Mediums*; Or upon all *Bodies*: But that the *Distance* must be Competent; The *Medium* not Adverse; And the *Body* Apt and Proportionate. Therefore if there be any Operation upon *Bodies*, in Absence, by Nature; it is like to be conveyed from *Man* to *Man*, as *Fame* is; As if a *Witch*, by *Imagination*, should hurt any a farre off, it cannot be naturally, but by Working upon the *Spirit* of some, that commeth to the *Witch*; And from that *Partie* upon the *Imagination* of *Another*; And so upon *Another*; till it come to one that hath resort to the *Partie Intended*; And so by *Him* to the *Partie intended himselfe*. And although they speake, that it sufficeth, to take a *Point*, or a *Peece* of the *Garment*, or the *Name* of the *Partie*, or the like; yet there is lesse Credit to be given to those Things, except it be by *Working* of evill *Spirits*.

The *Experiments*, which may certainly demonstrate the *Power* of *Imagination*, upon other *Bodies*, are few, or none: For the *Experiments* of *Witchcraft*, are no cleare Proofes; For that they may be, by a Tacite *Operation* of *Maligne Spirits*: We shall therefore be forced, in this *Enquirie*, to resort to New *Experiments*: Wherein we can give only *Directions* of *Trialls*, and not any *Positive Experiments*. And if any *Man* thinke, that we ought to have stayed, till wee had made *Experiment*, of some of them, our selves, (as wee doe commonly in other *Titles*,) the Truth is, that these *Effects* of *Imagination* upon other *Bodies*, have so little Credit with us, as we shall trie them at leisure: But in the meane Time, we will lead others the way.

951 When you worke by the *Imagination* of *Another*, it is necessarie, that He, by whom you worke, have a *Precedent Opinion* of you, that you can doe Strange Things; Or that you are a *Man* of *Art*, as they call it; For else the Simple *Affirmation* to Another, that this or that shall be, can worke but a weake *Impression*, in his *Imagination*.

952 It were good, because you cannot discerne fully of the *Strength* of *Imagination*, in one *Man* more than another, that you did use the *Imagination* of more than *One*; That so you may light upon a *Strong One*. As if a *Physitian* should tell Three, or Foure, of his *Patients Servants*, that their *Master* shall surely recover.

953 The *Imagination* of *One*, that you shall use, (such is the Varietie of *Mens Mindes*,) cannot be alwayes alike *Constant*, and *Strong*; And if the

Succeſſe follow not ſpeedily, it will faint and leeſe *Strength*. To remedy this, you muſt pretend to Him, whoſe *Imagination* you uſe, ſeverall *Degrees* of *Meanes*, by which to *Operate*; As to preſcribe him, that everie three Dayes, if he finde not the Succeſſe Apparent, he doe uſe another *Root*, or *Part* of a *Beaſt*, or *Ring*, &c. As being of more *Force*; And if that faile, Another; And if that, Another; till Seven Times. Alſo you muſt preſcribe a good Large Time for the *Effect* you promiſe; As if you ſhould tell a *Servant* of a *Sick-Man*, that his *Maſter* ſhall recover, but it will be Fourteene dayes, ere hee findeth it apparently, &c. All this to entertaine the *Imagination*, that it waver leſſe.

954 It is certaine, that *Potions*, or *Things* taken into the *Body*: *Incenſes* and *Perfumes* taken at the *Noſthrills*; And *Ointments* of ſome *Parts*; doe (naturally) worke upon the *Imagination* of Him that taketh them. And therefore it muſt needs greatly *Cooperate* with the *Imagination* of him, whom you uſe, if you preſcribe him, before he doe uſe the *Receit*, for the *Worke* which he deſireth, that hee doe take ſuch a *Pill*, or a *Spoonefull* of *Liquour*; Or burne ſuch an *Incenſe*; Or *Annoint* his *Temples*, or the *Soles* of his *Feet*, with ſuch an *Ointment*, or *Oyle*: And you muſt chuſe, for the *Compoſition* of ſuch *Pill*, *Perfume*, or *Ointment*, ſuch *Ingredients*, as doe make the *Spirits*, a little more *Groſſe*, or *Muddie*: Whereby the *Imagination* will fix the better.

955 The *Body Paſſive*, and to be *Wrought Vpon*, (I meane not of the *Imaginant*,) is better wrought upon, (as hath beene partly touched,) at ſome *Times*, than at others: As if you ſhould preſcribe a *Servant*, about a *Sicke Perſon*, (whom you have poſſeſſed, that his *Maſter* ſhall recover,) when his *Maſter* is faſt aſleepe, to uſe ſuch a *Root*, or ſuch a *Root*. For *Imagination* is like to worke better upon *Sleeping Men*, than *Men Awake*, As we ſhall ſhew when we handle *Dreames*.

956 Wee finde in the *Art* of *Memorie*, that *Images Viſible*, worke better than other *Conceits*: As if you would remember the Word *Philoſophy*, you ſhall more ſurely doe it, by *Imagining* that ſuch a *Man*, (For *Men* are beſt *Places*,) is reading upon *Ariſtotles Phyſicks*; Than if you ſhould Imagine him to ſay; *I'le goe ſtudie Philoſophy*. And therefore, this *Obſervation* would be tranſlated to the *Subject* wee now ſpeake of: For the more Luſtrous the *Imagination* is, it filleth and fixeth the better. And therefore I conceive, that you ſhall, in that *Experiment*, (whereof wee ſpake before,) of *Binding* of *Thoughts*, leſſe faile, if you tell One, that ſuch an *One* ſhall name one of *Twentie Men*, than if it were *One* of *Twentie Cards*. The *Experiment* of *Binding* of *Thoughts*, would be Diverſified, and tried to the Full: And you are to note, whether it hit for the moſt part, though not alwayes.

957 It is good to conſider, upon what *Things*, *Imagination* hath moſt Force: And the *Rule*, (as I conceive,) is, that it hath moſt *Force* upon *Things*, that have the *Lighteſt*, and *Eaſieſt Motions*. And therefore above all, upon the *Spirits* of *Men*: And in them, upon ſuch *Affections*, as move *Lighteſt*; As upon *Procuring* of *Love*; *Binding* of *Luſt*, which is ever

ever with *Imagination*, upon *Men* in *Feare*; Or *Men* in *Irresolution*; And the like. Whatsoever is of this kinde would be thorowly enquired. *Trialls* likewise would be made upon *Plants*, and that diligently: As if you should tell a *Man*, that such a *Tree* would Dye this yeare, And will him, at these and these times, to goe unto it, to see how it thriveth. As for *Inanimate Things*, it is true, that the *Motions* of *Shuffling* of *Cards*; or *Casting* of *Dice*, are verie *Light Motions*: And there is a *Folly* verie usuall, that *Gamesters* imagine, that some that stand by them, bring them ill Luck. There would be Triall also made, of holding a *Ring* by a *Threed* in a *Glasse*, and telling him that holdeth it, before, that it shall strike so many times against the *Side* of the *Glasse*, and no more; Or of Holding a *Key* betweene two *Mens Fingers*, without a *Charme*; And to tell those that hold it, that at such *Name*, it shall goe off their *Fingers*: For these two are Extreme *Light Motions*. And howsoever I have no *Opinion* of these things, yet so much I conceive to be true; That *Strong Imagination* hath more Force upon *Things Living*; Or that have beene *Living*, than *Things* meerely *Inanimate*: And more Force likewise upon *Light*, and *Subtill Motions*, than upon *Motions Vehement*, or *Ponderous*.

It is an usuall *Observation*, that if the *Body* of One *Murthered*, be brought before the *Murtherer*, the *Wounds* will bleed a-fresh. Some doe affirme, that the *Dead Body*, upon the Presence of the *Murtherer*, hath opened the *Eyes*; And that there have beene such like *Motions*, as well where the *Partie Murthered* hath beene *Strangled*, or *Drowned*, as where they have beene *Killed* by *Wounds*. It may be, that this participateth of a *Miracle*, by *Gods* Iust Iudgement, who usually bringeth *Murthers* to Light: But if it be *Naturall*, it must be referred to *Imagination*. 958

The *Tying* of the *Point* upon the day of *Marriage*, to make *Men* Impotent towards their *Wives*, which (as wee have formerly touched,) is so frequent in *Zant*, and *Gascony*, if it be *Naturall*, must be referred to the *Imagination* of *Him* that *Tieth* the *Point*. I conceive it to have the lesse Affinitie with *Witchcraft*, because not Peculiar Persons onely, (such as *Witches* are,) but any *Body* may doe it. 959

Experiments in Consort touching the *Secret Vertue* of *Sympathy*, and *Antipathy*.

THere be many *Things*, that worke upon the *Spirits* of *Man*, by *Secret Sympathy*, and *Antipathy*: The *Vertues* of *Pretious Stones*, worne, have been anciently and generally Received; And curiously assigned to worke severall *Effects*. So much is true; That *Stones* have in them fine *Spirits*; As appeareth by their *Splendour*: And therefore they may work by *Consent* upon the *Spirits* of *Men*, to Comfort, and Exhilarate them. Those that are the best, for that *Effect*, are the *Diamond*, the *Emerald*, the *Iacinth Orentall*, and the *Gold-Stone*, which is the *Yellow Topaze*. As for their particular *Proprieties*, there is no Credit to be given to them. But it is manifest, that *Light*, above all things, excelleth in *Comforting* the *Spirits* of *Men*: And it is verie probable, that *Light Varied* doth the same *Effect*, with more *Noveltie*. And this is one of the *Causes*, why *Pretious Stones* comfort. And therefore it were good to haue *Tinctted Lanthornes*, 960

or

or *Tinctèd Skreenes*, of *Glasse Coloured* into *Greene*, *Blew*, *Carnation*, *Crimson*, *Purple*, &c. And to use them with *Candles* in the *Night*. So likewise to have Round *Glasses*, not onely of *Glasse Coloured* thorow, but with *Colours* laid betweene *Crystals*, with *Handles* to hold in ones Hand. *Prismes* are also Comfortable Things. They have of *Paris-Worke*, *Looking-Glasses*, bordered with broad *Borders* of small *Crystall*, and great Counterfeit *Pretious Stones*, of all *Colours*, that are most Glorious and Pleasant to behold; Especially in the *Night*. The *Pictures* of *Indian Feathers*, are likewise Comfortable, and Pleasant to behold. So also Faire and Cleare *Pooles* doe greatly comfort the *Eyes*, and *Spirits*; Especially when the *Sunne* is not *Glaring*, but *Overcast*; Or when the *Moone* shineth.

961 There be divers Sorts of *Bracelets* fit to *Comfort* the *Spirits*, And they be of Three *Intentions*: *Refrigerant*; *Corroborant*; and *Aperient*. For *Refrigerant*, I wish them to be of *Pearle*, or of *Corall*, as is used: And it hath beene noted that *Corall*, if the *Partie* that weareth it be ill disposed, will wax *Pale*: Which I beleeve to be true, because otherwise *Distemper* of *Heat* will make *Corall* lose Colour. I Commend also *Beads* or little *Plates* of *Lapis Lazuli*; And *Beads* of *Nitre*, either alone, or with some *Cordiall Mixture*.

962 For *Corroboration* and *Confortation*, take such *Bodies* as are of *Astringent Qualitie*, without *Manifest Cold*. I commend *Bead Amber*, which is full of *Astriction*, but yet is *Vnctuous*, and not *Cold*; And is conceived to *Impinguate* those that weare such *Beads*: I commend also *Beads* of *Harts-Horne*, and *Ivorie*, which are of the like Nature; Also *Orenge-Beads*; Also *Beads* of *Lignum Aloës*, *Macerated* first in *Rose-Water*, and *Dryed*.

963 For *Opening*, I Commend *Beads*, or *Peeces* of the *Roots* of *Cardus Benedictus*: Also of the *Roots* of *Piony* the *Male*; And of *Orris*; And of *Calamus Aromaticus*; And of *Rew*.

964 The Cramp, (no doubt) commeth of *Contraction* of *Sinnewes*; Which is Manifest, in that it commeth either by *Cold*, or *Drinesse*; As after *Consumptions*, and *Long Agues*; For *Cold* and *Drinesse* doe (both of them) *Contract*, and *Corrugate*. Wee see also, that *Chafing* a little above the *Place* in paine, easeth the *Cramp*; Which is wrought by the *Dilatation*, of the *Contracted Sinnewes*, by *Heat*. There are in use, for the Prevention of the *Cramp*, two Things; The one *Rings* of *Sea-Horse Teeth* worne upon the *Fingers*; The other *Bands* of *Greene Periwinckle*, (the Herb,) tied about the *Calfe* of the *Leg*, or the *Thigh*, &c. where the *Cramp* useth to come. I doe finde this the more strange, because Neither of these have any *Relaxing Vertue*, but rather the Contrarie. I judge therefore, that their *Working*, is rather upon the *Spirits*, within the *Nerves*, to make them strive lesse; Than upon the *Bodily Substance* of the *Nerves*.

965 I would have *Triall* made of two other *Kindes* of *Bracelets*, for *Comforting* the *Heart*, and *Spirits*; The one of the *Trochisch* of *Vipers*, made into little *Peeces* of *Beads*; For since they do great Good Inwards, (especially for *Pestilent Agues*,) it is like they will be Effectuall Outwards; Where they may be applied in greater *Quantitie*. There would be *Trochisch* likewise

wise made of *Snakes*; Whose *Flesh dried*, is thought to have a verie *Opening*, and *Cordiall Vertue*. The other is, of *Beads* made of the *Scarlet Powder*, which they call *Kermes*; Which is the Principall *Ingredient* in their *Cordiall Confection Alkermes*: The *Beads* would be made up with *Amber-Grice*, and some *Pomander*.

It hath beene long received, and confirmed by divers *Trialls*; That the Root of the *Male-Piony*, dried, tied to the *Necke*, doth help the *Falling-Sickenesse*; And likewise the *Incubus*, which wee call the *Mare*. The *Cause* of both these *Diseases*, and especially of the *Epilepsie* from the *Stomach*, is the *Grossenesse* of the *Vapours*, which rise and enter into the *Cells* of the *Braine*: And therfore the *Working* is, by *Extreme*, and *Subtill Attenuation*; Which that *Simple* hath. I judge the like to be in *Castoreum*, *Muske*, *Rew-Seed*, *Agnus Castus Seed*, &c. 966

There is a *Stone*, which they call the *Bloud-Stone*, which worne is thought to be good for them that *Bleed* at the *Nose*: Which (no doubt) is by *Astriction*, and *Cooling* of the *Spirits*. *Quære*, if the *Stone* taken out of the *Toads Head*, be not of the like Vertue; For the *Toad* loveth *Shade*, and Cooleneſse. 967

Light may be taken from the *Experiment* of the *Horse-Tooth-Ring*; and the *Garland* of *Periwinckle*, how that those things, which asswage the *Strife* of the *Spirits*, doe help diseases, contrarie to the *Intention* desired: For in the *Curing* of the *Cramp*, the *Intention* is to relax the *Sinnewes*; But the *Contraction* of the *Spirits*, that they strive lesse, is the best Help: So to procure easie *Travailes* of *Women*, the Intention is to bring downe the *Childe*; But the best Help is, to stay the *Comming downe* too *Fast*: Whereunto they say, the *Toad-Stone* likewise helpeth. So in *Pestilent Feavers*, the *Intention* is to expell the *Infection* by *Sweat*, and *Evapouration*; But the best *Meanes* to doe it, is by *Nitre*, *Diascordium*, and other *Coole Things*, which doe for a time arrest the *Expulsion*, till *Nature* can doe it more quietly. For as one saith prettily; *In the Quenching of the Flame of a Pestilent Ague, Nature is like People, that come to quench the Fire of a House; which are so busie, as one of them letteth another.* Surely, it is an Excellent *Axiome*, and of Manifold *Vse*, that whatsoever appeaseth the *Contention* of the *Spirits*, furthereth their *Action*. 968

The *Writers* of *Naturall Magick*, commend the Wearing of the *Spoile* of a *Snake*, for *Preserving* of *Health*. I doubt it is but a *Conceit*; For that the Snake is thought to renue her *Youth*, by Casting her *Spoile*. They might as well take the *Beake* of an *Eagle*, or a Peece of a *Harts-Horne*, because those Renue. 969

It hath beene Anciently *Received*, (For *Pericles* the *Athenian* used it,) and it is yet in use, to weare little *Bladders* of *Quick-Silver*, or *Tablets* of *Arsenicke*, as *Preservatives* against the *Plague*: Not as they conceive, for any *Comfort* they yeeld to the *Spirits*, but for that being *Poysons* themselves, they draw the *Venome* to them, from the *Spirits*. 970

Vide the *Experiments* 95. 96. and 97. touching the *Severall Sympathies*, and *Antipathies*, for *Medicinall Vse*. 971

It

972 It is said, that the *Guts* or *Skin* of a *Wolfe* being applyed to the *Belly*, doe cure the *Cholicke*. It is true, that the *Wolfe* is a *Beast* of great *Edacitie* and *Disgestion*; And so, it may be, the *Parts* of him comfort the *Bowels*.

973 We see *Scare-Crowes*, are set up to keep *Birds* from *Corne*, and *Fruit*; It is reported by some, that the *Head* of a *Wolfe*, whole, dried, and hanged up in a *Dove-House*, will scare away *Vermine*; Such as are *Weasils*, *Polcats*, and the like. It may be, the *Head* of a *Dog* will doe as much; For those *Vermine* with us, know *Dogs* better than *Wolves*.

974 The *Braines* of some *Creatures*, (when their *Heads* are roasted) taken in *Wine*, are said to strengthen the *Memorie*: As the *Braines* of *Hares*; *Braines* of *Hens*; *Braines* of *Deeres*, &c. And it seemeth, to be incident to the *Braines* of those *Creatures*, that are Fearefull.

975 The *Ointment*, that *Witches* use, is reported to be made, of the *Fat* of *Children*, digged out of their *Graves*; Of the *Iuyces* of *Smallage*, *Wolfebane*, and *Cinquefoile*; Mingled with the *Meale* of fine *Wheat*. But I suppose that the *Soporiferous Medicines* are likest to doe it; Which are *Henbane*, *Hemlocke*, *Mandrake*, *Moone-Shade*, *Tobacco*, *Opium*, *Saffron*, *Poplar-Leaves*, &c.

976 It is reported by some, that the *Affections* of *Beasts*, when they are in Strength, doe adde some *Vertue*, unto *Inanimate Things*; As that the *Skin* of a *Sheepe*, devoured by a *Wolfe*, moveth *Itching*; That a *Stone*, bitten by a *Dog* in Anger, being throwne at him, drunke in *Powder*, provoketh *Choler*.

977 It hath beene observed, that the *Diet* of *Women* with *Childe*, doth worke much upon the *Infant*; As if the *Mother* eat *Quinces* much, and *Coriander-Seed*, (the *Nature* of both which is to represse and stay *Vapours*, that ascend to the *Braine*,) it will make the *Childe* Ingenious: And on the contrarie side, if the *Mother* eat (much) *Onions*, or *Beanes*, or such *Vapourous Food*; Or drinke *Wine*, or *Strong Drinke*, immoderately; Or *Fast* much; Or be given to much *Musing*; (All which send, or draw *Vapours* to the *Head*,) It endangereth the *Childe* to become *Lunacicke*, or of *Imperfect Memorie*: And I make the same Iudgement of *Tobacco*, often taken by the *Mother*.

978 The *Writers* of *Naturall Magick* report, that the *Heart* of an *Ape*, worne neare the *Heart*, comforteth the *Heart*, and increaseth *Audacitie*. It is true, that the *Ape* is a Merrie and Bold *Beast*. And that the same *Heart* likewise of an *Ape*, applyed to the *Necke*, or *Head*, helpeth the *wit*; And is good for the *Falling-Sickenesse*: The *Ape* also is a Wittie *Beast*, and hath a *Dry Braine*; Which may be some *Cause* of *Attenuation* of *Vapours* in the *Head*. Yet it is said to move *Dreames* also. It may be, the *Heart* of a *Man* would doe more, but that it is more against *Mens* Mindes to use it; Except it be in such as weare the *Reliques* of *Saints*.

979 The *Flesh* of a *Hedge-Hog*, Dressed, & Eaten, is said to be a great *Drier*: It is true, that the *Iuyce* of a *Hedge-Hog*, must needs be *Harsh*, & *Dry*, because it putteth forth so many *Prickles*: For *Plants* also, that are full of

Prickles,

Prickles, are generally Dry: As *Briars*, *Thornes*, *Berberries*: And therefore the *Ashes* of an *Hedge-Hog* are said to be a great *Desiccative* of *Fistula's*.

980 *Mummy* hath great force in *Stanching* of *Bloud*; which, as it may be ascribed to the *Mixture* of *Balmes*, that are *Glutinous*; So it may also partake of a Secret *Proprietie*; In that the *Bloud* draweth *Mans Flesh*. And it is approved, that the *Mosse*, which groweth upon the *Skull* of a *Dead Man*, unburied, will stanch *Bloud* potently. And so doe the *Dregs*, or *Powder* of *Bloud*, severed from the *Water*, and *Dried*.

981 It hath beene practised, to make *White Swallowes*, by *Annointing* of the *Egs* with *Oyle*. Which *Effect* may be produced, by the *Stopping* of the *Pores* of the *Shell*, and making the *Iuyce*, that putteth forth the *Feathers* afterwards, more Penurious. And it may be, the *Annointing* of the *Egs*, will be as Effectuall, as the *Annointing* of the *Body*; Of which *Vide* the *Experiment* 93.

982 It is reported, that the *White* of an *Egge*, or *Bloud*, mingled with *Salt-Water*, doth gather the *Saltnesse*, and maketh the *Water* sweeter. This may be by *Adhesion*; As in the 6. *Experiment* of *Clarification*: It may be also, that *Bloud*, and the *White* of an *Egge*, (which is the *Matter* of a *Living Creature*,) have some *Sympathy* with *Salt*: For all *Life* hath a *Sympathy* with *Salt*. We see that *Salt*, laid to a *Cut Finger*, healeth it; So as it seemeth *Salt* draweth *Bloud*, as well as *Bloud* draweth *Salt*.

983 It hath beene anciently received, that the *Sea-Hare*, hath an *Antipathy* with the *Lungs*, (if it commeth neare the Body,) and erodeth them. Whereof the *Cause* is conceived to be, a *Qualitie* it hath of *Heating* the *Breath*, and *Spirits*; As *Cantharides* have upon the *Watrie Parts* of the *Bodie*; As *Vrine* and *Hydropicall Water*. And it is a good *Rule*, that whatsoever hath an *Operation* upon certaine *Kindes* of *Matters*, that, in *Mans Body*, worketh most upon those *Parts*, wherein that kinde of *Matter* aboundeth.

984 Generally, that which is *Dead*, or *Corrupted*, or *Excerned*, hath *Antipathy* with the same *Thing*, when it is *Alive*, and when it is *Sound*; And with those *Parts* which doe *Excerne*: As a *Carkasse* of *Man* is most *Infectious*, and *Odious* to *Man*; A *Carrion* of an *Horse* to an *Horse*, &c. *Purulent Matter* of *Wounds*, and *Vlcers*, *Carbuncles*, *Pocks*, *Scabs*, *Leprousie*, to *Sound Flesh*; And the *Excrement* of everie *Species* to that *Creature* that *Excerneth* them. But the *Excrements* are lesse Pernicious than the *Corruptions*.

985 It is a Common *Experience*, that *Dogs* know the *Dog-Killer*; When as in times of *Infection*, some Pettie *Fellow* is sent out to kill the *Dogs*; And that, though they have never seene him before, yet they will all come forth, and barke, and flie at him.

986 The *Relations* touching the *Force* of *Imagination*, and the *Secret Instincts* of *Nature*, are so uncertaine, as they require a great deale of *Examination*, ere wee conclude upon them. I would have it first thorowly inquired, whether there be any Secret Passages of *Sympathy*, betweene

Persons

Persons of *neare Bloud*; As *Parents*, *Children*, *Brothers*, *Sisters*, *Nurse-Children*, *Husbands*, *Wives*, &c. There be many Reports in *Histories*, that upon the *Death* of *Persons* of such Neareneſſe, *Men* have had an inward *Feeling* of it. I my Selfe remember, that being in *Paris*, and my *Father* dying in *London*, two or three dayes before my *Fathers* death, I had a *Dreame*, which I told to divers *English Gentlemen*; That my *Fathers House*, in the *Country*, was *Plaſtered* all over with *Blacke Mortar*. There is an Opinion abroad, (whether Idle or no I cannot ſay,) That loving and kinde *Husbands*, have a *Senſe* of their *Wives Breeding Childe*, by some *Accident* in their owne *Bodie*.

987 Next to those that are *Neare* in *Bloud*, there may be the like *Paſſage*, and *Inſtincts* of *Nature*, betweene great *Friends*, and *Enemies*: And sometimes the Revealing it unto Another *Person*, and not to the *Partie* Himselfe. I remember *Philippus Commineus*, (a grave Writer,) reporteth; That the *Arch-Biſhop* of *Vienna*, (a *Reverend Prelate*,) said (one day) after *Maſſe*, to *King Lewis* the eleventh of *France*; *Sir, your Mortall Enemie is dead*; What time *Duke Charles* of *Burgundie* was Slaine, at the *Battell* of *Granſon*, against the *Switzers*. Some triall also would be made, whether *Pact* or *Agreement* doe any thing; As if two *Friends* should agree, that such a *Day* in everie *Weeke*, they being in farre *Diſtant Places*, should *Pray* one for Another; Or should put on a *Ring*, or *Tablet*, one for anothers Sake; Whether if one of them should breake their *Vow* and *Promiſe*, the other should have any *Feeling* of it, in *Abſence*.

988 If there be any *Force* in *Imaginations* and *Affections* of *Singular Perſons*; It is Probable the *Force* is much more in the *Ioynt Imaginations* and *Affections* of *Multitudes*: As if a *Victorie* should be won, or lost, in *Remote Parts*, whether is there not some *Senſe* thereof, in the *People* whom it concerneth; Becauſe of the great *Ioy*, or *Griefe*, that many *Men* are poſſeſt with at once? *Pius Quintus*, at the verie time, when that Memorable *Victorie* was won, by the *Chriſtians*, against the *Turks*, at the *Nevall Battell* of *Lepanto*, being then hearing of *Cauſes* in *Conſiſtorie*, brake off suddenly, and said to those about him, *It is now more time, wee ſhould give thanks to God, for the great Victorie hee hath granted us, againſt the Turks*. It is true, that *Victorie* had a *Sympathy* with his *Spirit*; For it was meerely his Worke, to conclude that *League*. It may be, that *Revelation* was *Divine*; But what shall we say then, to a Number of *Examples*, amongst the *Grecians*, and *Romans*? Where the *People*, being in *Theaters* at *Playes*, have had Newes of *Victories*, and *Overthrowes*, some few dayes, before any *Meſſenger* could come.

It is true, that that may hold in these Things, which is the generall *Root* of *Superſtition*: Namely, that *Men* obſerve when *Things Hit*, and not when they *Miſſe*: And commit to Memorie the one, And forget and paſſe over the other. But touching *Divination*, and the *Miſgiving* of *Mindes*, wee

shall

shall speake more, when wee handle in generall, the *Nature* of *Mindes*, and *Soules*, and *Spirits*.

Wee have given formerly some *Rules* of *Imagination*; And touching the *Fortifying* of the Same. Wee have set downe also some few *Instances*, and *Directions*, of the *Force* of *Imagination*, upon *Beasts*, *Birds*, &c. upon *Plants*; And upon *Inanimate Bodies*: Wherein you must still observe, that your *Trialls* be upon *Subtill* and *Light Motions*, and not the contrary; For you will sooner, by *Imagination*, binde a *Bird* from *Singing*, than from *Eating*, or *Flying*: And I leave it to every *Man*, to choose *Experiments*, which himselfe thinketh most Commodious; Giving now but a few *Examples* of every of the Three Kindes. 989

Use some *Imaginant*, (observing the *Rules* formerly prescribed,) for *Binding* of a *Bird* from *Singing*; And the like of a *Dogge* from *Barking*. Trie also the *Imagination* of some, whom you shall accommodate with things to fortifie it, in *Cocke-Fights*, to make one *Cocke* more Hardy, and the other more Cowardly. It would be tried also, in *Flying* of *Hawkes*; Or in *Coursing* of a *Deere*, or *Hare*, with *Grey-hounds*; Or in *Horse-Races*; And the like *Comparative Motions*: For you may sooner by *Imagination*, quicken or slacke a *Motion*, than raise or cease it; As it is easier to make a *Dogge* goe slower, than to make him stand still that he may not run. 990

In *Plants* also, you may trie the *Force* of *Imagination*, upon the *Lighter* Sort of *Motions*: As upon the Sudden *Fading*, or Lively *Comming up* of *Herbs*; Or upon their *Bending* one way, or other; Or upon their *Closing*, and *Opening*; &c. 991

For *Inanimate Things*, you may trie the *Force* of *Imagination*, upon Staying the *Working* of *Beere*, when the *Barme* is put in; Or upon the *Comming* of *Butter*, or *Cheese*, after the *Cherming*, or the *Rennet* bee put in. 992

It is an Ancient *Tradition*, every where alleaged, for *Example* of *Secret Proprieties* and *Influxes*, that the *Torpedo Marina*, if it be touched with a long Sticke, doth stupefie the *Hand* of him that toucheth it. It is one degree of *Working* at *Distance*, to worke by the Continuance of a Fit *Medium*; As *Sound* will be conveyed to the *Eare*, by striking upon a *Bow-String*, if the *Horne* of the *Bow* be held to the *Eare*. 993

The *Writers* of *Naturall Magicke*, doe attribute much to the *Vertues*, that come from the *Parts* of *Living Creatures*; So as they be taken from them, the *Creatures* remaining still alive: As if the *Creature* still living did infuse some *Immateriate Vertue*, and *Vigour*, into the *Part Severed*. So much may be true; that any *Part*, taken from a *Living Creature*, newly *Slaine*, may be of greater force, than if it were taken from the like *Creature*, *dying* of it *selfe*, because it is fuller of *Spirit*. 994

Triall would be made, of the like *Parts* of *Individualls*, in *Plants*, and *Living Creatures*; As to cut off a *Stocke* of a *Tree*; And to lay that, which you cut off, to *Putrifie*, to see whether it will Decay the Rest of the *Stocke*: Or if you should cut off part of the *Taile*, or *Legge* of a *Dogge*, 995

or a *Cat*, and lay it to *Putrifie*, and so see whether it will *Fester*, or keepe from *Healing*, the *Part* which remaineth.

996 It is received, that it helpeth to *Continue Love*, if one weare a *Ring*, or a *Bracelet*, of the *Haire* of the *Party Beloved*. But that may be by the *Exciting* of the *Imagination*: And perhaps a *Glove*, or other like *Favour*, may as well doe it.

997 The *Sympathie* of *Individuals*, that have beene *Entire*, or have *Touched*, is of all others the most *Incredible*: Yet according unto our faithfull Manner of *Examination* of *Nature*, we will make some little mention of it. The *Taking away* of *Warts*, by *Rubbing* them with Somewhat that afterwards is put to waste, and consume, is a Common *Experiment*: And I doe apprehend it the rather, because of mine owne *Experience*. I had, from my *Childhood*, a *Wart* upon one of my *Fingers*: Afterwards when I was about Sixteene Yeares old, being then at *Paris*, there grew upon both my *Hands* a Number of *Warts*, (at the least an hundred,) in a Moneths space. The *English Embassadours Lady*, who was a *Woman* farre from *Superstition*, told me, one day; Shee would helpe me away with my *Warts*: Whereupon shee got a *Peece* of *Lard*, with the *Skin* on, and rubbed the *Warts* all over, with the *Fat Side*; And amongst the rest that *Wart*, which I had had from my *Childhood*; Then she nailed the *Peece* of *Lard*, with the *Fat* towards the *Sunne*, upon a *Poast* of her *Chamber Window*, which was to the *South*. The Successe was, that within five weekes space, all the *Warts* went quite away: And that *Wart*, which I had so long endured, for Company. But at the rest I did little marvell, because they came in a Short time, and might goe away in a Short Time againe: But the Going away of that, which had staid so long, doth yet sticke with mee. They say the like is done, by the *Rubbing* of *Warts* with a Greene *Elder Sticke*, and then *Burying* the *Sticke* to *Rot* in *Mucke*. It would be tried, with *Cornes*, and *Wenns*, and such other *Excrescences*. I would have it also tried, with some *Parts* of *Living Creatures*, that are nearest the *Nature* of *Excrescences*; As the *Combes* of *Cocks*, the *Spurres* of *Cocks*, the *Hornes* of *Beasts*, &c. And I would have it tried both wayes; Both by *Rubbing* those *Parts* with *Lard*, or *Elder*, as before; And by *Cutting off* some *Peece* of those *Parts*, and laying it to *Consume*; To see whether it will Worke any Effect, towards the *Consumption* of that *Part*, which was once *Joyned* with it.

998 It is constantly Received, and Avouched, that the *Anointing* of the *Weapon*, that maketh the *Wound*, will heale the *Wound* it selfe. In this *Experiment*, upon the Relation of *Men* of *Credit*, (though my selfe, as yet, am not fully inclined to beleeve it,) you shall note the *Points* following. First, the *Ointment*, wherewith this is done, is made of Divers *Ingredients*; whereof the Strangest and Hardest to come by, are the *Mosse* upon the *Skull* of a *dead Man*, *Vnburied*; And the *Fats* of a *Boare*, and a *Beare*, killed in the *Act* of *Generation*. These two last I could easily suspect to be prescribed as a Starting Hole; That if the *Experiment* proved not, it mought be pretended, that the *Beasts* were not killed in the due Time;

For as for the *Mosse*, it is certaine, there is great Quantitie of it in *Ireland*, upon *Slaine Bodies*, laid on *Heaps*, *Vnburied*. The other *Ingredients* are, the *Blood-Stone* in *Powder*, and some other *Things*, which seeme to have a *Vertue* to *Stanch Bloud*; As also the *Mosse* hath. And the *Description* of the *whole Ointment* is to be found in the *Chymicall Dispensatorie* of *Crollius*. Secondly, the same *Kinde* of *Ointment*, applied to the *Hurt* it selfe, worketh not the *Effect*; but onely applied to the *Weapon*. Thirdly, (which I like well) they doe not observe the *Confecting* of the *Ointment*, under any certaine *Constellation*; which commonly is the Excuse of *Magicall Medicines*, when they faile, that they were not made under a fit *Figure* of *Heaven*. Fourthly, it may be applied to the *Weapon*, though the *Party Hurt* be at great *Distance*. Fiftly, it seemeth the *Imagination* of the Partie, to be *Cured*, is not needfull to Concurre; For it may be done, without the Knowledge, of the *Partie Wounded*; And thus much hath beene tried, that the *Ointment* (for *Experiments* sake,) hath beene wiped off the *Weapon*, without the Knowledge of the *Partie Hurt*, and presently the *Partie Hurt*, hath beene in great *Rage* of *Paine*, till the *Weapon* was *Reannointed*. Sixtly, it is affirmed, that if you cannot get the *Weapon*, yet if you put an *Instrument* of *Iron*, or *Wood*, resembling the *Weapon*, into the *Wound*, whereby it bleedeth, the *Annointing* of that *Instrument* will serve, and worke the *Effect*. This I doubt should be a Device, to keepe this strange *Forme* of *Cure*, in Request, and Use; Because many times you cannot come by the *Weapon* it selfe. Seventhly, the *Wound* must be at first *Washed cleane*, with *White Wine*, or the *Parties* owne *Water*; And then bound up close in *Fine Linnen*, and no more *Dressing* renewed, till it be *whole*. Eighthly, the *Sword* it selfe must be *Wrapped* up *Close*, as farre as the *Ointment* goeth, that it taketh no *wind*. Ninthly, the *Ointment*, if you *wipe* it off from the *Sword*, and keepe it, will *Serve againe*; and rather *Increase* in *Vertue*, than *Diminish*. Tenthly, it will *Cure* in farre *Shorter Time*, than *Ointments* of *Wounds* commonly doe. Lastly, it will *Cure* a *Beast*, as well as a *Man*; which I like best of all the rest, because it subjecteth the *Matter*, to an *Easie Triall*.

I Would have *Men* know, that though I reprehend, the *Easie Passing over*, of the *Causes* of *Things*, by Ascribing them to *Secret* and *Hidden Vertues*, and *Proprieties*; (For this hath arrested, and laid asleepe, all true *Enquiry*, and *Indications*;) yet I doe not understand, but that in the *Practicall Part* of *Knowledge*, much will be left to *Experience*, and *Probation*, whereunto *Indication* cannot so fully reach: And this not onely in *Specie*, but in *Individuo*. So in *Physicke*, if you will cure the *Iaundies*, it is not enough to say, that the *Medicine* must not be Cooling; For that will hinder the *Opening* which the *Disease* requireth: That it must not be *Hot*; For that will exasperate *Choler*: That it must goe to the *Gall*; For there is the *Obstruction* which causeth the *Disease*, &c. But you must receive from *Experience*, that *Powder* of *Chamæpytis*, or the like, drunke in *Beere*, is good for the *Iaundies*: So againe, a wise *Physitian* doth not continue still

Experiment Solitary touching *Secret Proprieties*. 999

ſtill the ſame *Medicine*, to a *Patient*; But he will vary, if the firſt *Medicine* doth not apparently ſucceed: For of thoſe *Remedies*, that are good for the *Iaundies*, *Stone*, *Agues*, &c. that will doe good in one *Body*, which will not doe good in another; According to the Correſpondence the *Medicine* hath to the *Individuall Body*.

Experiment Solitary, touching the *Generall Sympathy* of *Mens Spirits*.

1000

THe *Delight* which *Men* have in *Popularitie*, *Fame*, *Honour*, *Submiſſion*, and *Subjection* of other *Mens Mindes*, *Wills*, or *Affections*, (although theſe *Things* may be deſired for other *Ends*,) ſeemeth to be a *Thing*, in it ſelfe, without Contemplation of Conſequence, Gratefull and agreeable to the *Nature* of *Man*. This Thing (ſurely) is not without ſome Signification, as if all *Spirits* and *Soules* of *Men*, came forth out of one *Divine Limbus*; Elſe why ſhould *Men* be ſo much affected with that, which others thinke, or ſay? The beſt Temper of *Mindes* deſireth *Good Name*, and *True Honour*: The Lighter, *Popularitie*, and *Applauſe*; The more depraved, *Subjection*, and *Tyranny*; As is ſeene in great *Conquerours*, and *Troublers* of the *World*: And yet more in *Arch-Heretickes*; for the Introducing of new *Doctrines*, is likewiſe an *Affectation* of *Tyranny*, over the *Vnderſtandings*, and *Beleefes* of *Men*.

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FINIS.

His Lo^ps. Usuall Receipt for the Gout, to which the Sixtieth Experiment hath reference, was this.

To be taken in this Order.

1. The Pultasse.

℞ *Of Manchett, about 3. Ounces, the Crumme onely, thin cut; Let it be boyled in Milk, till it grow to a Pulp. Adde, in the end, a Dramme, and an halfe, of the powder of Red Roses.*
Of Saffron 10. Graines.
Of Oyle of Roses an Ounce.
Let it be spred upon a Linnen Cloth, and applyed lukewarme; And continued for three Houres space.

2. The Bath, or Fomentation.

℞ *Of Sage-Leaves, half an handfull.*
Of the Root of Hemlock, Sliced, 6. Dramms.
Of Briony Roots, half an Ounce.
Of the Leaves of Red Roses, 2. Pugills.
Let them be boyled, in a pottle of Water, wherein Steele hath been quenched, till the Liquour come to a Quart. After the Straining, put in halfe an handfull of Bay-Salt.
Let it be used, with Scarlet Cloth or Scarlet Wooll, dipped in the Liquour hot, and so renewed seven times; All in the space of a Quarter of an Houre, or little more.

3. The Plaster.

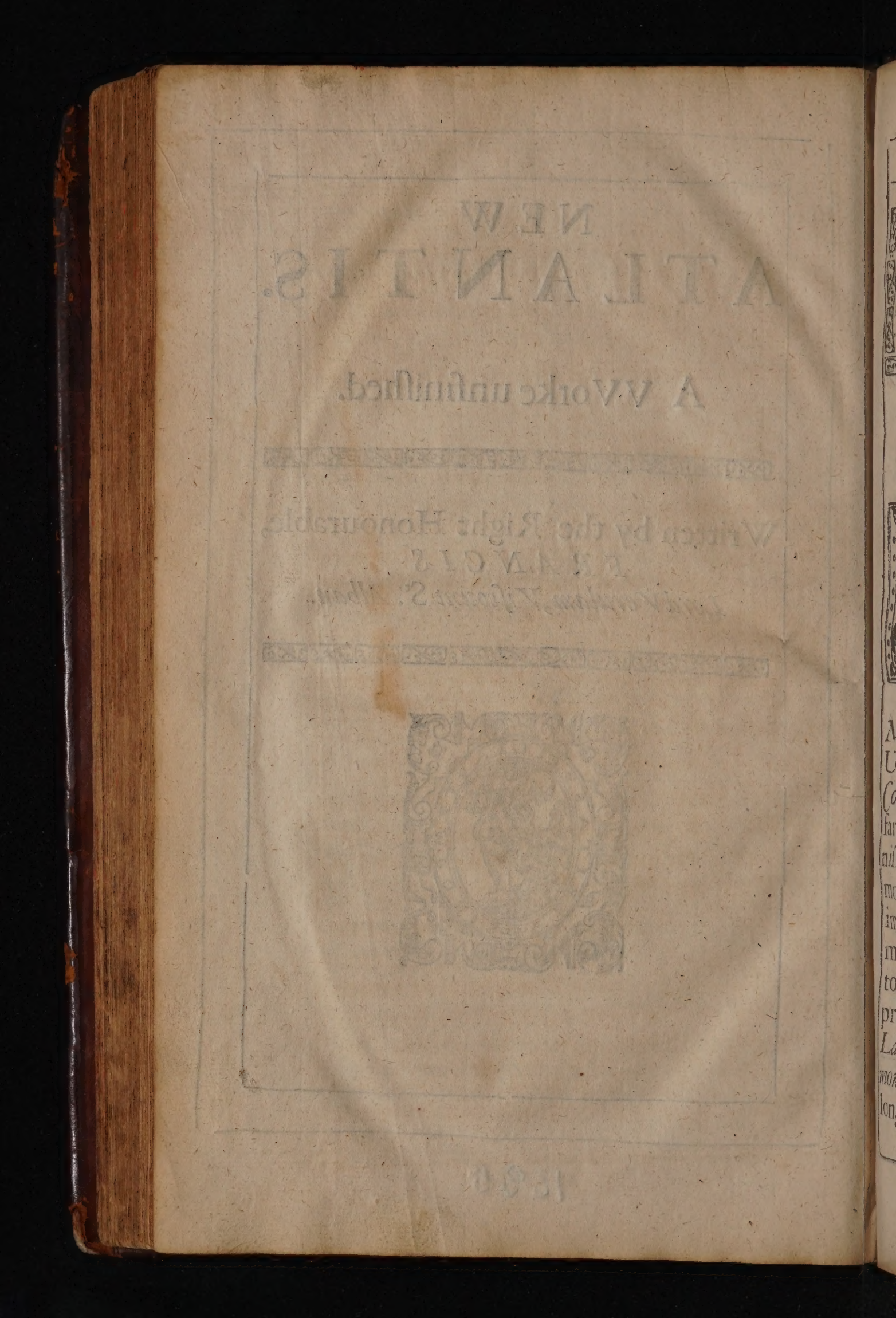
℞ Emplastrum Diacalciteos, *as much as is sufficient, for the part, you meane to cover. Let it be dissolved with Oyle of Roses, in such a Consistence, as will stick; And spred upon a peece of Holland, and applyed.*

NEW ATLANTIS.

A VVorke unfiniſhed.

Written by the Right Honourable,
FRANCIS
Lord Verulam, Viſcount S^t. Alban.

1635



To the Reader.

THis *Fable* my *Lord* deviſed, to the end that Hee might exhibite therein, a *Modell* or *Deſcription* of a *College*, inſtituted for the *Interpreting* of *Nature*, and the Producing of *Great* and *Marvellous Works* for the *Benefit* of *Men*; Under the Name of *Salomons Houſe*, or the *College of the Six dayes Works*. And even ſo farre his *Lordſhip* hath proceeded, as to finiſh that Part. Certainly, the *Modell* is more Vaſt, and High, than can poſsibly be imitated in all things; Notwithſtanding moſt Things therin are within Mens Power to effect. His *Lordſhip* thought alſo in this preſent *Fable*, to have compoſed a *Frame* of *Lawes*, or of the *beſt State* or *Mould* of a *Common-wealth*; But fore-ſeeing it would be a long Worke, his Deſire of Collecting the

Naturall Historie Diverted him, which He preferred many degrees before it.

This Worke of the *New Atlantis*, (as much as concerneth the *English Edition*) his *Lordship* designed for this Place; In regard it hath so neere Affinitie (in one Part of it) with the Preceding *Naturall Historie*.

W: Rawley.

New Atlantis.

WE Sailed from *Peru*, (where we had continued by the space of one whole yeare,) for *China* and *Japan*, by the South Sea; taking with us Victuals for twelve Moneths; And had good Winds from the East, though soft and weake, for five Moneths space, and more. But then the Wind came about, and setled in the West for many dayes, so as we could make little or no way, and were sometimes in purpose to turne back. But then againe there arose Strong and Great Winds from the South, with a Point East; which carried us up, (for all that we could doe) towards the North: By which time our Victualls failed us, though we had made good spare of them. So that finding our selves, in the Midst of the greatest Wildernesse of Waters in the World, without Victuall, wee gave our Selves for lost Men, and prepared for Death. Yet wee did lift up our Hearts and Voices to GOD above, who *sheweth his Wonders in the Deepe*; Beseeching him of his Mercie, that as in the *Beginning* He discovered the *Face* of the *Deepe*, and brought forth *Dry-Land*; So he would now discover Land to us, that wee mought not perish. And it came to passe, that the next Day about Evening, wee saw within a Kenning before us, towards the North, as it were thicke Clouds, which did put us in some hope of Land; Knowing how that part of the South Sea was utterly unknowne; And might have Islands, or Continents, that hitherto were not come to light.

Where-

Wherefore we bent our Course, thither, where wee saw the Appearance of Land, all that night; And in the Dawning of the next Day, we might plainly discerne that it was a Land; Flat to our sight, and full of Boscage, which made it shew the more Dark. And after an Houre and an halfes Sayling, we entred into a good *Haven*, being the Port of a faire *Citie*; Not great indeed, but well built, and that gave a pleasant view from the Sea: And we thinking every Minute long, till wee were on Land, came close to the Shore, and offered to land. But straightwayes we saw divers of the People, with Bastons in their Hands, (as it were) forbidding us to land; Yet without any Cries or Fiercenesse, but onely as warning us off, by Signes that they made. Whereupon being not a little discomforted, wee were advising with our selves, what we should doe. During which time, there made forth to us a small Boat, with about eight Persons in it; whereof One of them had in his Hand a Tipstaffe of a yellow Cane, tipped at both ends with Blew, who came aboord our Shipp, without any shew of Distrust at all. And when hee saw one of our Number, present himselfe somewhat afore the rest, hee drew forth a little Scroule of Parchment, (somewhat yellower than our Parchment, and shining like the Leaves of Writing Tables, but otherwise soft and flexible,) and delivered it to our foremost Man. In which Scroule were written in Ancient *Hebrew*, and in Ancient *Greeke*, and in good *Latine* of the Schoole, and in *Spanish*, these words; *Land yee not, none of you; And provide to be gone from this Coast, within sixteene dayes, except you have further time given you. Meanewhile, if you want Fresh Water, or Victuall, or help for your Sick, or that your Ship needeth repaire, write downe your wants, and you shall have that, which belongeth to Mercie.* This Scroule was Signed with a Stamp of *Cherubins Wings*, not spred, but hanging downwards; And by them a *Crosse*. This being delivered, the *Officer* returned, and left onely a Servant with us to receive our Answer. Consulting hereupon amongst our Selves, we were much perplexed. The Deniall of Landing, & Hastie Warning us away, troubled us much; On the other

side

ſide, to finde that the People had Languages, and were ſo full of Humanitie, did comfort us not a little. And above all, the Signe of the *Croſſe* to that Inſtrument, was to us a great Rejoycing, and as it were a certaine Preſage of Good. Our Anſwer was in the *Spaniſh* Tongue; *That for our Ship, it was well; For wee had rather mett with Calmes, and contrarie winds, than any Tempeſts. For our Sicke, they were many, and in verie ill Caſe; So that if they were not permitted to Land, they ran in danger of their Lives.* Our other Wants we ſet downe in particular, adding; *That we had ſome little ſtore of Merchandize, which if it pleaſed them to deale for, it might ſupply our Wants, without being chargeable unto them.* Wee offered ſome Reward in Piſtolets unto the Servant, and a peece of Crimſon Velvett to be preſented to the *Officer:* But the Servant tooke them not, nor would ſcarce looke upon them; And ſo left us, and went back in another little Boat, which was ſent for him.

About three Houres after we had diſpatched our Anſwer, there came towards us, a Perſon (as it ſeemed) of Place. He had on him a Gowne with wide Sleeves, of a kinde of Water Chamolett, of an excellent Azure Colour, farre more gloſſie than ours: His under Apparell was Greene; And ſo was his Hatt, being in the forme of a Turban, daintily made, and not ſo huge as the *Turkiſh* Turbans; And the Locks of his Haire came downe below the Brimms of it. A Reverend Man was hee to behold. Hee came in a Boat, gilt in ſome part of it, with foure Perſons more onely in that Boat; And was followed by another Boat, wherein were ſome Twentie. When hee was come within a Flight-ſhott of our Shipp, Signes were made to us, that we ſhould ſend forth ſome to meet him upon the Water; which wee preſently did in our Shipp-Boat, ſending the principall Man amongſt us ſave one, and foure of our Number with him. When wee were come within ſix yards of their Boat, they called to us to ſtay, and not to approach further; which we did. And thereupon the Man, whom I before deſcribed, ſtood up, and with a loud voice, in *Spaniſh*, asked; *Are yee Chriſtians?*

Christians? Wee answered; *Wee were*; fearing the lesse, because of the *Crosse* wee had seene in the Subscription. At which Answer the said Person lift up his Right Hand towards Heaven, and drew it softly to his Mouth, (which is the Gesture they use, when they thanke GOD;) And then said: *If yee will sweare, (all of you,) by the Merits of the* SAVIOUR, *that yee are no Pirates; Nor have shed bloud, lawfully, nor unlawfully, within fortie dayes past; you may have License to come on Land.* Wee said, *Wee were all ready to take that Oath.* Whereupon one of those that were with him, being (as it seemed) a *Notarie*, made an Entrie of this Act. Which done, another of the Attendants of the Great Person, which was with him in the same Boat, after his Lord had spoken a little to him, said aloud; *My Lord would have you know, that it is not of Pride, or Greatnesse, that hee commeth not aboord your Shipp; But for that, in your Answer, you declare, that you have many Sicke amongst you, hee was warned by the* Conservatour *of* Health, *of the* Citie, *that hee should keepe a distance.* Wee bowed our selves towards him, and answered; *Wee were his humble Servants; And accounted for great Honour, and singular Humanitie towards us, that which was already done; But hoped well, that the Nature of the Sickenesse, of our Men, was not infectious.* So hee returned; And a while after came the *Notarie* to us aboord our Ship; Holding in his hand a Fruit of that Countrey, like an Orenge, but of colour betweene Orenge-tawney and Scarlet; which cast a most excellent Odour. He used it (as it seemeth) for a Preservative against Infection. Hee gave us our Oath; *By the Name of Jesus, and his Merits:* And after told us, that the next day, by six of the Clocke, in the Morning, we should be sent to, and brought to the *Strangers House*, (so he called it,) where we should be accommodated of things, both for our Whole, and for our Sicke. So he left us; And when wee offered him some Pistoletts, hee smiling said; *He must not be twice paid, for one Labour:* Meaning (as I take it) that hee had Salarie sufficient of the *State* for his Service. For (as I after learned) they call an Officer, that taketh Rewards, *Twice-paid.*

The

The next Morning earely, there came to us the same *Officer*, that came to us at first with his Cane, and told us; *Hee came to conduct us to the* Strangers House; *And that hee had prevented the Houre, because wee might have the whole day before us, for our Businesse. For* (said hee) *If you will follow mine Advice, there shall first goe with mee some few of you, and see the place, and how it may be made convenient for you; And then you may send for your Sicke, and the rest of your Number, which yee will bring on Land.* Wee thanked him, and said; *That this Care, which he tooke of desolate Strangers,* GOD *would reward.* And so six of us went on Land with him: And when wee were on Land, hee went before us, and turned to us, and said; *Hee was but our Servant, and our Guide.* Hee ledd us thorow three faire Streets; And all the way wee went, there were gathered some People on both sides, standing in a Row; But in so civill a fashion, as if it had beene, not to wonder at us, but to welcome us: And divers of them, as wee passed by them, put their Armes a little abroad; which is their Gesture, when they bid any welcome. The *Strangers House* is a faire and spacious House, built of Brick, of somewhat a blewer Colour than our Brick; And with handsome windowes, some of Glasse, some of a kinde of Cambrick oyl'd. Hee brought us first into a faire Parlour above staires, and then asked us; *What Number of Persons we were? And how many sicke?* We answered, *Wee were in all, (sicke and whole,) one and fiftie Persons, whereof our sicke were seventeene.* He desired us to have patience a little, and to stay till hee came backe to us; which was about an Houre after; And then hee led us to see the Chambers, which were provided for us, being in number nineteene. They having cast it (as it seemeth) that foure of those Chambers, which were better than the rest, might receive foure of the principall Men of our Company; And lodge them alone by themselves; And the other 15. Chambers were to lodge us two and two together. The Chambers were handsome and cheerefull Chambers, and furnished civilly. Then hee ledd us to a long Gallerie, like a Dorture, where hee

shewed us all along the one side (for the other side was but Wall and Window,) seventeene Cells, verie neat ones, having partitions of Cedar wood. Which Gallerie, and Cells, being in all fortie, (many more than we needed,) were instituted as an Infirmarie for sicke Persons. And hee told us withall, that as any our Sick waxed well, hee might be removed from his Cell, to a Chamber: For which purpose, there were set forth ten spare Chambers, besides the Number wee spake of before. This done, hee brought us back to the Parlour, and lifting up his Cane a little, (as they doe when they give any Charge or Command) said to us; *Yee are to know, that the Custome of the Land requireth, that after this day, and to morrow, (which wee give you for removing of your people from your Ship,) you are to keep within dores for three daies. But let it not trouble you, nor doe not thinke your selves restrained, but rather left to your Rest and Ease. You shall want nothing, and there are six of our People appointed to attend you for any Businesse you may have abroad.* Wee gave him thankes, with all Affection and Respect, and said; GOD *surely is manifested in this Land.* Wee offered him also twentie Pistoletts; But hee smiled, and onely said; *What? twice paid!* And so he left us. Soone after our Dinner was served in; Which was right good Viands, both for Bread, and Meat: Better than any *Collegiate* Diett, that I have knowne in *Europe*. We had also Drinke of three sorts, all wholesome and good; Wine of the Grape; A Drinke of Graine, such as is with us our Ale, but more cleare: And a kinde of Sider made of a Fruit of that Countrey; A wonderfull pleasing & Refreshing Drink. Besides, there were brought in to us, great store of those Scarlett Orenges, for our Sick; which (they said) were an assured Remedy for sicknes taken at Sea. There was given us also, a Box of small gray, or whitish Pills, which they wished our Sicke should take, one of the Pills, everie night before sleepe; which (they said) would hasten their Recoverie. The next day, after that our Trouble of Carriage, and Removing of our Men, and Goods, out of our Shipp, was somewhat setled and quiett, I thought good to call our

Company

Company together, and when they were assembled, said unto them; *My deare Friends; Let us know our selves, and how it standeth with us. Wee are Men cast on Land, as* Jonas *was, out of the* Whales *Belly, when wee were as buried in the Deepe: And now wee are on Land, wee are but betweene Death and Life; For we are beyond, both the Old World, and the New; And whether ever wee shall see* Europe, GOD *onely knoweth. It is a kinde of Miracle hath brought us hither: And it must bee little lesse, that shall bring us hence. Therefore in regard of our Deliverance past, and our danger present, and to come, let us looke up to* GOD, *and everie man reforme his owne wayes. Besides we are come here amongst a* Christian People, *full of Pietie and Humanitie: Let us not bring that Confusion of face upon our selves, as to shew our vices, or unworthinesse before them. Yet there is more. For they have by Commandement, (though in forme of Courtesie) Cloistered us within these Walls, for three dayes: Who knoweth, whether it be not, to take some taste of our manners and conditions? And if they finde them bad, to banish us straight-wayes; If good, to give us further time. For these Men, that they have given us for Attendance, may withall have an eye upon us. Therefore for* GODS *love, and as we love the weale of our Soules and Bodies, let us so behave our selves, as wee may be at peace with* GOD, *and may finde grace in the Eyes of this People.* Our Company with one voyce thanked mee for my good Admonition, and promised me to live soberly and civilly, and without giving any the least occasion of Offence. So wee spent our three dayes joyfully, and without care, in expectation what would be done with us, when they were expired. During which time, wee had everie houre joy of the Amendment of our Sicke, who thought themselves cast into some Divine *Poole* of *Healing*; They mended so kindly, and so fast.

The Morrow after our three dayes were past, there came to us a new Man, that wee had not seene before, cloathed in Blew as the former was, save that his Turban was white, with a small red Crosse on the Topp. Hee had also a Tippet of fine Linnen. At his Comming in, hee did bend to us a

little, and put his Armes abroad. Wee of our parts saluted him in a verie lovvly and submissive manner; As looking that from him, wee should receive Sentence of Life, or Death. He desired to speake with some few of us: Whereupon six of us onely stayed, and the rest avoyded the Roome. Hee said; *I am by Office Governour of this House of Strangers, and by Vocation I am a* Christian Priest; *And therefore am come to you, to offer you my service, both as Strangers, and chiefly as* Christians. *Some things I may tell you, which I thinke you will not bee unwilling to heare. The State hath given you Licence to stay on Land, for the space of six weekes: And let it not trouble you, if your occasions aske further time, for the Law in this point is not precise; And I doe not doubt, but my selfe shall be able, to obtaine for you, such further time, as may be convenient. Yee shall also understand, that the* Strangers House, *is at this time Rich, and much aforehand; For it hath laid up Revenue these 37. yeares: For so long it is, since any Stranger arrived in this part. And therefore take yee no care; The* State *will defray you all the time you stay: Neither shall you stay one day the lesse for that. As for any Merchandize yee have brought, yee shall be well used, and have your returne, either in Merchandize, or in Gold and Silver: For to us it is all one. And if you have any other Request to make, hide it not. For yee shall finde, wee will not make your Countenance to fall, by the Answer yee shall receive. Only this I must tell you, that none of you must goe above a* Karan, (that is with them a Mile and an halfe) *from the walls of the Citie, without especiall leave.* Wee answered, after wee had looked a while one upon another, admiring this gracious and parent-like usage; *That we could not tell what to say: For wee wanted words to expresse our Thanks; And his Noble free Offers left us nothing to aske. It seemed to us, that wee had before us a picture of our* Salvation *in* Heaven: *For wee that were a while since in the Jawes of Death, were now brought into a place, where wee found nothing but Consolations. For the Commandement laid upon us, we would not faile to obey it, though it was impossible, but our Hearts should be enflamed to tread further upon this Happie and Holy Ground.*

Wee

Wee added; *That our Tongues should first cleave to the Rooses of our Mouths, ere we should forget, either his Reverend Person, or this whole Nation, in our Prayers.* Wee also most humbly besought him, to accept of us as his true servants, by as just a Right, as ever Men on Earth were bounden; laying and presenting, both our Persons, and all wee had, at his feet. Hee said; *Hee was a Priest, and looked for a Priests reward; which was our Brotherly love, and the Good of our Soules and Bodies.* So hee went from us, not without teares of Tenderesse in his Eyes; And left us also confused with Ioy and Kindnesse, saying amongst our selves; *That wee were come into a Land of Angells, which did appeare to us daily, and prevent us with Comforts, which we thought not of, much lesse expected.*

The next day about 10. of the Clocke, the Governour came to us againe, and after Salutations, said familiarly; *That hee was come to visit us*; And called for a Chaire, and satt him downe; And wee being some 10. of us, (the rest were of the meaner Sort; or else gone abroad;) sate downe with him. And when wee were sett, hee began thus. *Wee of this Island of Bensalem* (for so they call it in their Language) *have this; That by meanes of our solitarie Situation; and of the Lawes of Secrecie, which wee have for our Travellers; and our rare Admission of Strangers; we know well most part of the Habitable World, and are our selves unknowne. Therefore because hee that knoweth least, is fittest to aske Questions, it is more Reason, for the Entertainment of the time, that yee aske me Questions, than that I aske you.* VVe answered; *That wee humbly thanked him, that he would give us leave so to doe: And that wee conceived by the taste wee had already, that there was no worldly thing on Earth, more worthy to be knowne, than the State of that happie Land. But above all* (wee said) *since that wee were mett from the severall Ends of the World; and hoped assuredly, that wee should meet one day in the* Kingdome *of* Heaven (*for that wee were both parts* Christians) *wee desired to know (in respect that Land was so remote, and so divided by vast and unknowne Seas, from the Land, where our* SAVIOVR *walked on Earth*) who

who was the Apostle *of that Nation, and how it was converted to the* Faith? It appeared in his face, that hee tooke great Contentment in this our Question: Hee said; *Yee knit my Heart to you, by asking this Question in the first place; For it sheweth that you* First seeke the Kingdome of Heaven; *And I shall gladly, and briefly, satisfie your demand.*

About twenty Yeares after the Ascension of our SAVIOVR, *it come to passe, that there was seene by the People of* Renfusa, *(a Citie upon the Easterne Coast of our Island,) within Night, (the Night was Cloudie, and Calme,) as it might be some mile into the Sea, a great Pillar of Light; Not sharp, but in forme of a Columne, or* Cylinder, *rising from the Sea, a great way up towards Heaven; and on the topp of it was seene a large Crosse of Light, more bright and resplendent than the Bodie of the Pillar. Vpon which so strange a Spectacle, the People of the Citie gathered apace together upon the Sands, to wonder; And so after put themselves into a number of small Boats, to goe neerer to this Marvellous sight. But when the Boats were come within (about) 60. yeards of the Pillar, they found themselves all bound, and could goe no further; yet so as they might move to goe about, but might not approach neerer: So as the Boats stood all as in a Theater, beholding this Light, as an Heavenly Signe. It so fell out, that there was in one of the Boats, one of our Wise Men, of the Societie of* Salomons House; *which* House, *or* College *(my good Brethren) is the verie Eye of this Kingdome; Who having a while attentively and devoutly viewed, and contemplated this Pillar, and Crosse, fell downe upon his face; And then raised himselfe upon his knees, and lifting up his Hands to Heaven, made his prayers in this manner.*

LOrd God *of Heaven and Earth; thou hast vouchsafed of thy Grace, to those of our* Order, *to know thy Works of Creation, and the Secretts of them; And to discerne (as farre as appertaineth to the Generations of Men) Between Divine Miracles, Works of Nature, Works of Art,*

Art, and Impostures and Illusions of all sorts. I doe here acknowledge and testifie before this people, that the Thing which we now see before our eyes, is thy Finger, *and a true* Miracle. *And for-as-much, as we learne in our Books, that thou never workest Miracles, but to a Divine and Excellent End, (for the Lawes of Nature are thine owne Lawes, and thou exceedest them not but upon great cause) wee most humbly beseech thee, to prosper this great Signe; And to give us the Interpretation and use of it in Mercie; Which thou doest in some part secretly promise, by sending it unto us.*

When hee had made his Prayer, hee presently found the Boat he was in, moveable, and unbound; whereas all the rest remained still fast; And taking that for an assurance of Leave to approach, hee caused the Boat to be softly, and with silence, rowed towards the Pillar. *But ere hee came neere it; the* Pillar *and* Crosse *of* Light *brake up, and cast it selfe abroad, as it were, into a Firmament of many Starres; which also vanished soone after, and there was nothing left to be seene, but a small* Arke, *or* Chest *of* Cedar, *drie, and not wett at all with water, though it swam. And in the Fore-end of it, which was towards him, grew a small greene Branch of Palme; And when the wise Man had taken it, with all reverence, into his Boat. it opened of it selfe, and there were found in it, a* Booke, *and a* Letter; *Both written in fine Parchment, and wrapped in Sindons of Linnen. The* Booke *contained all the* Canonicall Bookes *of the* Old *and* New Testament, *according as you have them; (For wee know well what the* Churches *with you receive;) And the* Apocalypse *it selfe; And some other* Bookes *of the* New Testament, *which were not at that time written, were nevertheless in the* Booke. *And for the* Letter, *it was in these words.*

I Bartholomew

I Bartholomew, *a Servant of the Highest, and Apostle of* Iesvs Christ, *was warned by an Angell, that appeared to me, in a vision of Glorie, that I should commit this* Arke *to the flouds of the Sea. Therefore, I doe testifie and declare, vnto that People, where* God *shall ordaine this* Arke *to come to Land, that in the same day, is come unto them Salvation and Peace, and Good Will, from the* Father, *and from the* Lord Iesvs.

There was also in both these writings, as well the Booke, *as the* Letter, *wrought a great Miracle, Conforme to that of the* Apostles, *in the Originall* Gift *of* Tongues. *For there being at that time, in this Land,* Hebrewes, Persians, *and* Indians, *besides the Natives, everie one read upon the* Booke, *and* Letter, *as if they had beene written in his owne Language. And thus was this Land saved from Infidelitie, (as the Remaine of the Old World was from Water) by an* Arke, *through the Apostolicall and Miraculous* Evangelisme *of* Saint Bartholomew. And here hee paused, and a Messenger came, and called him from us. So this was all that passed in that Conference.

The next Day, the same Governour came againe to us, immediately after Dinner, and excused himselfe, saying; *That the Day before, hee was called from us, somewhat abruptly, but now he would make us amends, and spend time with us; if wee held his Company, and Conference agreeable.* Wee answered; *That wee held it so agreeable and pleasing to us, as wee forgot both Dangers past, and Feares to come, for the time wee heard him speake; And that wee thought, an Houre spent with him, was worth Yeares of our former life.* Hee bowed himselfe a little to us, and after we were set againe, he said; *Well, the Questions are on your part.* One of our Number said, after a little Pause; *That there was a Matter, wee were no lesse desirous to know, than fearefull to aske, lest wee might presume too farre.*

But

But encouraged by his rare Humanitie towards us, (that could scarce thinke our selves Strangers, being his vowed and professed Servants,) we would take the Hardines to propound it: Humbly beseeching him, if he thought it not fit to bee answered, that he would pardon it, though he rejected it. Wee said; *Wee well observed those his words, which he formerly spake, that this happie Island, where we now stood, was knowne to few, and yet knew most of the Nations of the World; which we found to be true, considering they had the Languages of* Europe, *and knew much of our State and Businesse; And yet we in* Europe, *(notwithstanding all the remote Discoveries, and Navigations of this last Age) never heard any of the least Inkling or Glimse of this Island. This we found wonderfull strange; For that all Nations have Enterknowledge one of another, either by Voyage into Forraigne Parts, or by Strangers that come to them: And though the Travailer into a Forreine Countrey, doth commonly know more by the Eye, than he that stayeth at home can by relation of the Travailer; Yet both wayes suffice to make a mutuall Knowledge, in some degree, on both parts. But for this Island, wee never heard tell of any Shipp of theirs, that had beene seene to arrive upon any shore of* Europe; *No, nor of either the* East *or* West Indies, *nor yet of any Shipp of any other part of the World, that had made returne from them. And yet the Marvell rested not in this; For the Situation of it (as his Lordship said,) in the secret Conclave of such a vast Sea mought cause it. But then, that they should have Knowledge of the Languages, Bookes, Affaires, of those that lye such a distance from them, it was a thing wee could not tell what to make of; For that it seemed to us a condition and Proprietie of Diuine Powers and Beings, to be hidden and unseene to others, and yet to have others open, and as in a light to them.* At this speech the Governour gave a gracious smile, and sayd; *That we did well to aske pardon for this Question wee now asked; For that it imported, as if we thought this Land, a Land of Magicians, that sent forth Spirits of the Ayre into all parts, to bring them Newes and Intelligence of other Countries.* It was answered by us all, in all possible humblenesse, but yet with a Countenance taking knowledge, that we knew

he spake it but merrily; *That wee were apt enough to thinke, there was somewhat supernaturall in this Island; but yet rather as Angelicall, than Magicall. But to let his Lordship know truely, what it was, that made us tender and doubtfull to aske this Question, it was not any such conceit, but because we remembred, he had given a Touch in his former Speech, that this Land had Lawes of Secrecy touching Strangers.* To this he said; *You remember it aright: And therefore in that I shall say to you, I must reserve some particulars, which it is not lawfull for me to reveale, but ~~there~~ there will be enough left, to give you satisfaction.*

You shall understand (that which perhaps you will scarce think credible) that about three thousand Yeares agoe, or somewhat more, the Navigation of the World (specially for remote Voyages) was greater than at this Day. Doe not thinke with your selves, that I know not how much it is encreased with you, within these sixscore Yeares: I know it well; And yet I say, greater then, than now: Whether it was, that the Example of the Ark, *that saved the Remnant of Men, from the* universall Deluge, *gave Men confidence to adventure upon the Waters; Or what it was; but such is the Truth. The* Phœniceans, *and specially the* Tyrians, *had great Fleetes. So had the* Carthaginians *their Colony, which is yet further West. Toward the East the Shipping of* Egypt, *and of* Palestina *was likewise great.* China *also, and the great* Atlantis, (*that you call* America) *which have now but Iunks, and Cano's, abounded then in tall Ships. This Island, (as appeareth by faithfull Registers of those times) had then fifteene hundred strong Ships, of great content. Of all this, there is with you sparing Memory, or none; But we have large Knowledge thereof.*

At that time, this Land was knowne and frequented by the Shipps and Vessells of all the Nations before named. And (as it commeth to passe) they had many times Men of other Countries, that were no Saylers, that came with them; As Persians, Chaldeans, Arabians; *So as almost all Nations of Might and Fame resorted hither; Of whom we have some Stirps, and little Tribes with us, at this day. And for our owne Shippes, they went sundry Voyages; as well to your* Streights, *which you call the* Pillars *of* Hercules, *As to other parts in the*

Atlantique and Mediterrane Seas; As to Paguin, (which is the same with Cambaline) and Quinzy, upon the Orientall Seas, as farre as to the Borders of the East Tartary.

At the same time, and an Age after, or more, the Inhabitants of the great Atlantis did flourish. For though the Narration and Description, which is made by a great Man with you, that the Descendents of Neptune planted there; and of the Magnificent Temple, Palace, City, & Hill; And the manifold streames of goodly Navigable Rivers, (which as so many Chaines environed the same Site, and Temple;) And the severall Degrees of Ascent, whereby Men did climb up to the same, as if it had bin a Scala Cæli, be all Poeticall and Fabulous: Yet so much is true, that the said Country of Atlantis; As well that of Peru then called Coya, as that of Mexico then named Tyrambel, were mighty and proud Kingdomes, in Armes, Shipping, & Riches: So Mighty, as at one time, (or at least within the space of ten yeares,) they both made two great Expeditions; They of Tirambel through the Atlantique to the Mediterrane Sea; and they of Coya through the South Sea upon this our Island: And for the former of these, which was into Europe, the same Authoc amongst you, (as it seemeth,) had some celation from the Egyptian Priest, whom he citeth. For assuredly such a thing there was. But whether it were the Ancient Athenians, that had the glory of the Repulse, and Resistance of those Forces, I can say nothing: But certaine it is, there never came backe, either Ship, or Man, from that Voyage. Neither had the other Voyage of those of Coya upon us, had better fortune, if they had not met with Enemies of greater clemency. For the King of this Island, (by name Altabin,) a wise Man, and a great Warrier; Knowing well both his owne strength, and that of his Enemies; handled the matter so, as he cut off their Land-Forces, from their Ships; and entoyled both their Navy, and their Campe, with a greater Power than theirs, both by Sea and Land: And compelled them to render themselves without striking stroke: And after they were at his Mercy, contenting himselfe onely with their Oath, that they should no more beare Armes against him, dismissed them all in safetie. But the Divine Revenge overtooke not long after those proud Enterprises. For within lesse than the space of one Hundred

Yeares, the Great Atlantis was utterly lost and destroyed: Not by a great Earthquake, as your Man saith; (For that whole Tract is little subject to Earthquakes;) But by a particular Deluge or Inundation; Those Countries having, at this Day, far greater Rivers, and far higher Mountaines, to powre downe Waters, than any part of the Old World. But it is true, that the same Inundation was not deepe; Not past fortie foot, in most places, from the Ground; So that, although it destroyed Man and Beast generally, yet some few wild Inhabitants of the Wood escaped. Birds also were saved by flying to the high Trees and Woods. For as for Men, although they had Buildings in many places, higher than the Depth of the Water; Yet that Inundation, though it were shallow, had a long Continuance; whereby they of the Vale, that were not drowned, perished for want of Food, and other things necessary. So as marvaile you not at the thinne Population of America, nor at the Rudenesse and Ignorance of the People; For you must account your Inhabitants of America as a young People; Younger a thousand yeares, at the least, than the rest of the World: For that there was so much time, betweene the Universall Floud, and their Particular Inundation. For the poore Remnant of Humane Seed, which remained in their Mountaines, Peopled the Countrey againe slowly; by little and little; And being simple and savage People, (Not like Noah and his Sonnes, which was the chiefe Family of the Earth) they were not able to leave Letters, Arts, and Civilitie, to their Posteritie; And having likewise in their Mountanous Habitations beene used, (in respect of the Extreme Cold of those Regions,) to cloath themselves with the Skinnes of Tygers, Beares, and great Hairy Goates, that they have in those Parts; When after they came downe into the Valley, and found the intolerable Heats which are there, and knew no meanes of lighter Apparell; they were forced to beginne the Custome of Going Naked, which continueth at this day. Onely they take great pride and delight, in the Feathers of Birds; And this also they tooke from those their Ancestours of the Mountaines, who were invited unto it, by the infinite Flights of Birds, that came up to the high Grounds, while the Waters stood below. So you see, by this maine Acci-

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dent of Time, wee loſt our Traffique with the Americans, with whom, of all others, in regard they lay neareſt to us, wee had moſt Commerce. As for the other Parts of the World, it is moſt manifeſt, that in the Ages following, (whether it were in reſpect of Warres, or by a naturall Revolution of Time,) Navigation did every where greatly decay; And ſpecially, farre Voyages, (the rather by the uſe of Gallies, and ſuch Veſſells as could hardly brooke the Ocean,) were altogether left and omitted. So then, that part of Entercourſe, which could be from other Nations, to Sayle to us, you ſee how it hath long ſince ceaſed; Except it were by ſome rare Accident, as this of yours. But now of the Ceſſation of that other Part of Entercourſe, which mought be by our Sayling to other Nations, I muſt yeeld you ſome other Cauſe. For I cannot ſay, (if I ſhall ſay truely,) but our Shipping, for Number, Strength, Mariners, Pylots, and all things that appertaine to Navigation, is as great as ever; And therefore why we ſhould ſit at home, I ſhall now give you an account by it ſelfe; And it will draw nearer, to give you ſatisfaction, to your principall Queſtion.

There raigned in this Iſland, about 1900. yeares agoe, a King, whoſe memory of all others we moſt adore; Not Superſtitiouſly, but as a Divine Inſtrument, though a Mortall Man: His Name was Salomona: And we eſteeme him as the Law-giver of our Nation. This King had a large heart, inſcrutable for good; And was wholly bent to make his Kingdome and People Happie. He therefore taking into Conſideration, how ſufficient and ſubſtantive this Land was, to maintaine it ſelfe, without any ayd (at all) of the Forrainer; Being 5600. Miles in circuit, and of rare Fertilitie of Soyle, in the greateſt part thereof; And finding alſo the Shipping of this Country mought be plentifully ſet on worke, both by Fiſhing, and by Tranſportations from Port to Port, and likewiſe by Sayling unto ſome ſmall Iſlands that are not farre from us, and are under the Crowne and Lawes of this State; And recalling into his Memory the happy and flouriſhing Eſtate, wherein this Land then was; So as it mought be a thouſand wayes altered to the worſe, but ſcarce any one way to the better; thought nothing

wanted to his Noble and Heroicall Intentions, but onely (as farre as Humane foresight mought reach) to give perpetuitie to that, which was in his time so happily established. Therefore amongst his other Fundamentall Lawes of this Kingdome, he did ordaine the Interdicts and Prohibitions, which wee have touching Entrance of Strangers; which at that time (though it was after the Calamitie of America) was frequent; Doubting Novelties, and Commixture of Manners. It is true, the like Law, against the Admission of Strangers without License, is an Ancient Law, in the Kingdome of China, and yet continued in use. But there it is a poore Thing; And hath made them a curious, ignorant, fearefull, foolish Nation. But our Law-giver made his Law of another temper. For first, hee hath preserved all points of Humanitie, in taking Order, and making Provision for the Relieve of Strangers distressed; whereof you have tasted. At which Speech (as reason was) wee all rose up, and bowed our selves. Hee went on. That King also still desiring to joyne Humanitie and Policie together; And thinking it against Humanitie, to detaine Strangers here against their wills; And against Policy, that they should returne, and discover their Knowledge of this Estate, he tooke this Course: He did ordaine, that of the Strangers, that should be permitted to Land, as many (at all times) mought depart as would; But as many as would stay, should have very good Conditions, and Meanes to live, from the State. Wherein hee saw so farre, that now in so many Ages since the Prohibition, wee have memory not of one Ship that ever returned, and but of thirteene Persons onely, at severall times, that chose to returne in our Bottomes. What those few that returned may have reported abroad I know not. But you must thinke, Whatsoever they have said, could bee taken where they came, but for a Dreame. Now for our Travelling from hence into Parts abroad, our Law-giver thought fit altogether to restraine it. So is it not in China. For the Chinesses sayle where they will, or can; which sheweth, that their Law of Keeping out Strangers, is a Law of Pusillanimitie, and feare. But this restraint of ours, hath one onely Exception, which is admirable; Preserving the good which commeth

meth by communicating with Strangers, and avoyding the Hurt; And I will now open it to you. And here I shall seeme a little to digresse, but you will by and by finde it pertinent. Yee shall understand, (my deare Friends,) that amongst the Excellent Acts of that King, one above all hath the preheminence. It was the Erection, and Institution of an Order, or Societie, which we call Salomons House; The Noblest Foundation, (as wee thinke,) that ever was upon the Earth; And the Lanthorne of this Kingdome. It is dedicated to the Study of the Works, and Creatures of God. Some thinke it beareth the Founders Name a little corrupted, as if it should be Solamona's House. But the Records write it, as it is spoken. So as I take it to be denominate of the King of the Hebrewes, which is famous with you, and no Stranger to us; For wee have some Parts of his Works, which with you are lost; Namely that Naturall History, which hee wrote of all Plants, from the Cedar of Libanus, to the Mosse that groweth out of the Wall; And of all things that have Life and Motion. This maketh me thinke, that our King finding himselfe to Symbolize, in many things, with that King of the Hebrewes (which lived many yeares before him) honoured him with the Title of this Foundation. And I am the rather induced to be of this Opinion, for that I finde in ancient Records, this Order or Societie is sometimes called Salomons House; And sometimes the Colledge of the six Dayes Workes; whereby I am satisfied, That our Excellent King had learned from the Hebrewes, That God had created the World, and all that therein is, within six Dayes; And therefore hee instituting that House, for the finding out of the true Nature of all Things, (whereby God mought have the more Glory in the Workemanship of them, and Men the more fruit in the Use of them,) did give it also that second Name. But now to come to our present purpose. When the King had forbidden, to all his People, Navigation into any Part, that was not under his Crowne, he made nevertheless this Ordinance; That every twelve years there should be set forth, out of this Kingdome, two Shippes, appointed to severall Voyages; That in either of these Shippes, there should be a Mission of three of the Fellowes, or Brethren of Salomons House; whose

whose Errand was onely to give us Knowledge of the Affaires and State of those Countries, to which they were designed; And especially of the Sciences, Arts, Manufactures, and Inventions of all the World; And withall to bring unto us, Bookes, Instruments, and Patternes, in every kinde: That the Ships, after they had landed the Brethren, *should returne; And that the* Brethren *should stay abroad till the new Mission. These Ships are not otherwise fraught, than with Store of Victualls, and good Quantitie of Treasure to remaine with the* Brethren, *for the buying of such Things, and rewarding of such Persons, as they should thinke fit. Now for me to tell you, how the Vulgar sort of Marriners are contained from being discovered at Land; And how they that must be put on shore for any time, colour themselves vnder the Names of other Nations; And to what places these Voyages have beene designed; And what places of* Rendez-Vous *are appointed for the new Missions; And the like Circumstances of the Practique; I may not doe it; Neither is it much to your desire. But thus you see, wee maintaine a Trade, not for Gold, Silver, or Jewels; Nor for Silkes; Nor for Spices; Nor any other Commoditie of Matter; But onely for* Gods *first Creature, which was* Light: *To have* Light *(I say) of the Growth of all Parts of the World.* And when he had said this, he was silent; And so were we all. For indeed wee were all astonished, to heare so strange things so probably told. And he perceiving, that we were willing to say somewhat, but had it not ready, in great Courtesie tooke us off, and descended to aske us Questions of our Voyage and Fortunes, and in the end concluded, that we mought doe well, to thinke with our selves, what Time of stay wee would demand of the State; And bad us not to scant our selves; For he would procure such Time as wee desired. Whereupon wee all rose up, and presented our selves to kisse the skirt of his Tippet; But hee would not suffer us; and so tooke his leave. But when it came once amongst our People, that the State used to offer Conditions to Strangers that would stay, wee had Worke enough to get any of our Men to looke to our Shipp; And

to

to keepe them from going presently to the Governour, to crave Conditions. But with much adoe we refrained them, till we mought agree what Course to take.

We took our selves now for free men, seeing there was no danger of our utter Perdition; And lived most joyfully, going abroad, and seeing what was to be seen, in the Citie, and places adjacent, within our *Tedder*; And obtaining Acquaintance with many of the Citie, not of the meanest Qualitie; At whose hands we found such Humanitie, and such a Freedome and desire, to take Strangers, as it were, into their Bosome, as was enough to make us forget all that was deare to us, in our owne Countries; And continually wee mett with many things, right worthy of Observation, & Relation: As indeed, if there be a Mirrour in the World, worthy to hold Mens Eyes, it is that Countrey. One day there were two of our Company bidden to a *Feast* of the *Family*, as they call it. A most Naturall, Pious, & Reverend Custome it is, shewing that Nation to be compounded of all Goodnes. This is the manner of it. It is granted to any Man, that shall live to see thirtie Persons, descended of his Body, alive together, and all above 3. yeares old, to make this *Feast*, which is done at the Cost of the State. The *Father* of the *Family*, whom they call the *Tirsan*, two dayes before the *Feast*, taketh to him three of such Friends as he liketh to chuse; And is assisted also by the Governour of the Citie, or Place, where the *Feast* is celebrated; And all the *Persons* of the *Family*, of both Sexes, are summoned to attend him. These two dayes the *Tirsan* sitteth in Consultation, concerning the good Estate of the *Family*. There, if there be any Discord or Suits between any of the Family, they are compounded and appeased. There, if any of the Family be Distressed or Decayed, order is taken for their Releefe, and competent meanes to live. There, if any be subject to vice, or take ill Courses, they are reproved and Censured. So likewise, Direction is given touching Marriages, and the Courses of life, which any of them should take, with divers other the like Orders and Advices. The Governour assisteth, to the end, to put in Execution, by his

Publike Authoritie, the Decrees and Orders of the *Tirsan*, if they should be disobeyed; Though that seldome needeth; Such Reverence and Obedience they give, to the Order of Nature. The *Tirsan* doth also then, ever chuse one Man from amongst his Sonnes, to live in House with him; Who is called, ever after, the *Sonne of the Vine*. The Reason will hereafter appeare. On the *Feast* day, the *Father* or *Tirsan* commeth forth after Divine Service, into a large Roome, where the *Feast* is celebrated; Which Roome hath an Halfe-Pace at the upper end: Against the wall, in the middle of the Halfe-pace, is a Chaire placed for him, with a Table and Carpet before it. Over the Chaire is a State, made Round or Ovall, and it is of Ivie; An Ivie somewhat whiter than ours, like the Leafe of a Silver Aspe, but more shining; For it is greene all Winter. And the State is curiously wrought with Silver and Silke of divers Colours, broyding or binding in the Ivie; And is ever of the worke, of some of the Daughters of the Family; And vailed over at the Topp, with a fine Nett of Silke and Silver. But the Substance of it, is true Ivie; whereof, after it is taken downe, the Friends of the Family, are desirous to have some Leafe or Sprigg to keepe. The *Tirsan* commeth forth with all his Generation or Linage, the Males before him, and the Females following him; And if there be a Mother, from whose Body the whole Linage is descended, there is a Traverse placed in a Loft above, on the right hand of the Chaire, with a privie Doore, and a carved Window of Glasse, leaded with Gold and blew; Where shee sitteth, but is not seene. When the *Tirsan* is come forth, hee sitteth downe in the Chaire; And all the Linage place themselves against the wall, both at his backe, and upon the Returne of the Halfe-pace, in Order of their yeares, without difference of Sex, and stand upon their Feet. When hee is sett, the Roome being alwayes full of Company, but well kept and without Disorder, after some pause, there commeth in from the lower end of the Roome, a *Taratan*, (which is as much as an *Herald*;)

And

And on either side of him two *young Lads*; Whereof one carrieth a Scrowle of their shining yellow Parchment; And the other a Cluster of Grapes of Gold, with a long Foot or Stalke. The *Herald*, and *Children*, are cloathed with Mantles of Sea-water greene Sattin; But the *Heralds* Mantle is streamed with Gold, and hath a Traine. Then the *Herald* with three Curtesies, or rather Inclinations, commeth up as farre as the Halfe-pace; And there first taketh into his Hand the Scrowle. This Scrowle is the *Kings Charter*, containing Gift of Revenue, and many Privileges, Exemptions, and Points of Honour, granted to the *Father* of the *Family*; And it is ever stiled and directed; *To such an One, Our welbeloved Friend and Creditour*: Which is a Title proper onely to this Case. For they say, the King is Debtor to no Man, but for Propagation of his Subjects. The Seale set to the *Kings Charter*, is the Kings Image, Imbossed or moulded in Gold; And though such *Charters* be expidited of Course, and as of Right, yet they are varied by discretion, according to the Number and Dignitie of the *Family*. This *Charter* the *Herald* readeth aloud; And while it is read, the *Father* or *Tirsan*, standeth up, supported by two of his Sonnes, such as hee chooseth. Then the *Herald* mounteth the Halfe-Pace, and delivereth the *Charter* into his Hand; And with that there is an Acclamation, by all that are present, in their Language, which is thus much; *Happie are the people of Bensalem*. Then the *Herald* taketh into his Hand from the other Child, the Cluster of Grapes, which is of Gold; Both the Stalke, and the Grapes. But the Grapes are daintily enamelled; And if the Males of the *Family* be the greater number, the Grapes are enamelled Purple, with a little Sunne set on the Topp; If the Females, then they are enamelled into a greenish yellow, with a Cressant on the Topp. The Grapes are in number as many as there are Descendents of the *Family*. This Golden Cluster, the *Herald* deliuereth also to the *Tirsan*; Who presently delivereth it over, to that Sonne, that hee had formerly

merly choſen, to be in Houſe with him; Who beareth it before his *Father*, as an Enſigne of Honour, when hee goeth in publike ever after; And is thereupon called *the Sonne of the Vine*. After this Ceremonie ended, the *Father* or *Tirſan* retireth; And after ſome time commeth forth againe to Dinner, where hee ſitteth alone under the State, as before; And none of his Deſcendants ſit with him, of what Degree or Dignitie ſoever, except hee hap to be of *Salomons Houſe*. Hee is ſerved onely by his owne Children, ſuch as are Male; who performe unto him all ſervice of the Table upon the knee; And the VVomen only ſtand about him, leaning againſt the wall. The Roome below the Halfe-pace, hath Tables on the ſides for the Gheſts that are bidden; VVho are ſerved with great and comely Order; And towards the end of Dinner (which in the greateſt Feaſts with them, laſteth never above an Houre and an halfe) there is an *Hymne* ſung, varied according to the Invention of him that compoſeth it; (for they have excellent Poeſie;) But the Subject of it is, (alwayes,) the praiſes of *Adam*, and *Noah*, and *Abraham*; Whereof the former two Peopled the World, and the laſt was the *Father* of the *Faithfull*: Concluding ever with a Thankeſgiving for the *Nativitie* of our *Saviour*, in whoſe Birth, the Births of all are onely Bleſſed. Dinner being done, the *Tirſan* retireth againe; And having withdrawne himſelfe alone into a place; where hee maketh ſome private Prayers, hee commeth forth the third time, to give the Bleſſing; with all his Deſcendants, who ſtand about him, as at the firſt. Then hee calleth them forth by one and by one, by name, as hee pleaſeth, though ſeldome the Order of Age be inverted. The perſon that is called, (the Table being before removed,) kneeleth downe before the Chaire, and the *Father* layeth his Hand, upon his Head, or her Head, and giveth the Bleſſing in theſe Words; *Sonne of Benſalem*, (or *Daughter of Benſalem*,) *thy Father ſaith it; The Man by whom thou haſt Breath and Life ſpeaketh the word; The Bleſſing of the Everlaſting Father,*

the Prince of Peace, and the Holy Dove, be upon thee, and make the dayes of thy Pilgrimage, good, and many. This hee saith to everie of them; And that done, if there be any of his Sonnes, of eminent Meritt and Vertue, (so they be not above two,) hee calleth for them againe; And saith, laying his Arme over their shoulders, they standing; *Sonnes, it is well yee are borne, give God the praise, and persevere to the end.* And withall delivereth to either of them a Jewell, made in the Figure of an Eare of Wheat, which they ever after weare in the front of their Turban, or Hat. This done, they fall to Musicke and dances, And other Recreations, after their manner, for the rest of the day. This is the full order of that *Feast.*

By that time, six or seven Dayes were spent, I was fallen into straight Acquaintance, with a *Merchant* of that *Citie*, whose Name was *Joabin*; Hee was a *Jew* and *Circumcised:* For they have some few Stirps of *Jewes*, yet remaining amongst them, whom they leave to their owne Religion. Which they may the better doe, because they are of a farre differing Disposition from the *Jewes* in other Parts. For whereas they hate the *Name* of CHRIST; And have a secret inbred Rancour against the People amongst whom they live; These (contrariwise) give unto our SAVIOVR many high Attributes, and love the *Nation* of *Bensalem*, extremely. Surely this Man, of whom I speake, would ever acknowledge, that CHRIST was borne of a *Virgin*; And that hee was more than a Man; And hee would tell how GOD made him Ruler of the *Seraphims*, which guard his Throane; And they call him also the *Milken Way*, and the *Eliah* of the *Messiah*; And many other High Names; which though they be inferiour to his Divine Majestie, Yet they are farre from the Language of other *Jewes*. And for the Countrey of *Bensalem*, this Man would make no end of commending it; Being desirous by Tradition amongst the *Jewes* there, to have it beleeved, that the People thereof, were of the Generations of *Abraham*, by another Sonne, whom they call *Nathoran*; And that

that *Moſes* by a ſecret *Cabala* ordained the Lawes of *Benſalem*, which they now uſe; And that when the *Meſſiah* ſhould come, and ſit in his Throne at *Hieruſalem*, the King of *Benſalem*, ſhould at his feet, whereas other Kings ſhould keepe a great diſtance. But yet ſetting aſide theſe *Jewiſh* Dreames, the Man was a wiſe Man, and learned, and of great Policie, and excellently ſeene in the Lawes and Cuſtomes of that Nation. Amongſt other Diſcourſes, one day, I told him, I was much affected with the Relation I had, from ſome of the Company, of their Cuſtome, in holding the *Feaſt* of the *Family*; For that (mee thought) I had never heard of a Solemnitie, wherein Nature did ſo much preſide. And becauſe Propagation of Families, proceedeth from the Nuptiall Copulation, I deſired to know of him, what Lawes and Cuſtomes they had concerning Marriage; And whether they kept Marriage well; And whether they were tyed to one Wife; For that where Population is ſo much affected, and ſuch as with them it ſeemed to be, there is commonly Permiſſion of *Pluralitie* of *Wives*. To this he ſaid; *You have Reaſon for to commend that excellent Inſtitution of the* Feaſt *of the* Family. *And indeed wee have Experience, that thoſe Families, that are partakers of the Bleſſing of that Feaſt, doe flouriſh and proſper ever after, in an extraordinarie manner. But heare mee now, and I will tell you what I know. You ſhall underſtand, that there is not under the Heavens, ſo chaſte a Nation, as this of Benſalem; Nor ſo free from all Pollution, or fouleneſſe. It is the Virgin of the World. I remember I have read in one of your* Europæan *Bookes, of an holy Hermit amongſt you, that deſired to ſee the* Spirit *of* Fornication, *and there appeared to him, a little foule ugly* Æthiope. *But if hee had deſired to ſee the* Spirit *of* Chaſtitie *of* Benſalem, *it would have appeared to him, in the likeneſſe of a faire beautifull* Cherubin. *For there is nothing, amongſt Mortall Men, more faire and admirable, than the Chaſte Mindes of this People. Know therefore, that with them there are no Stewes, no diſſolute Houſes, no Curtiſans, nor any thing of that kinde. Nay they wonder (with deteſtation) at you in* Europe, *which*

permit

permit such things. They say yee have put Marriage out of office: For Matriage is ordained a Remedy for unlawfull Concupiscence; And Naturall Concupiscence seemeth as a Spurre to Marriage. But when Men have at hand a Remedy more agreeable to their corrupt will, Marriage is almost expulsed. And therefore there are with you seene infinite Men, that marrie not, but chuse rather a libertine and impure single Life, than to be yoaked in Marriage; And many that doe marrie, marrie late, when the Prime and Strength of their Yeares is past. And when they doe marrie, what is Marriage to them, but a verie Bargaine; Wherein is sought Alliance, or Portion, or Reputation, with some desire (almost indifferent) of Issue; And not the faithfull Nuptiall Union of Man and Wife, that was first instituted. Neither is it possible, that those that have cast away so basely, so much of their Strength, should greatly esteeme Children, (being of the same Matter,) as Chaste Men doe. So likewise during Marriage is the Case much amended, as it ought to be if those things were tolerated onely for necessitie? No, but they remaine still as a verie Affront to Marriage. The Haunting of those dissolute places, or resort to Curtizans, are no more punished in Married Men, than in Batchelors. And the depraved Custume of change, and the Delight in Meretricious Embracements, (where sinne is turned into Art,) maketh Marriage a dull thing, and a kinde of Imposition, or Tax. They heare you defend these things, as done to avoid greater Evils; As Advoutries, Deflouring of Virgins, Vnnaturall lust, and the like. But they say, this is a preposterous Wisdome; And they call it Lot's offer, who to save his Guests from abusing, Offered his Daughters: Nay they say further, That there is little gained in this; For that the same Vices and Appetites, doe still remaine and abound; Vnlawfull Lust being like a Furnace, that if you stopp the Flames altogether, it will quench; But if you give it any vent, it will rage. As for Masculine Love, they have no touch of it; And yet there are not so faithfull & inviolate Friendships, in the world againe, as are there: And to speake generally, (as I said before,) I have not read of any such Chastitie, in any People, as theirs: And their usuall saying is, That whosoever is unchaste cannot reverence himselfe: And they say;

That

That the Reverence of a Mans selfe, is (next Religion) the chiefest Bridle of all Vice. And when hee had said this, the good *Jew* paused a little; Whereupon, I farre more willing to heare him speake on, than to speake my selfe; yet thinking it decent, that upon his pause of Speech, I should not be altogether silent, said onely this; *That I would say to him, as the* Widow *of* Sarepta *said to* Elias; *that hee was come to bring to Memorie our Sinnes; And that I confesse the* Righteousnesse *of* Bensalem, *was greater than the* Righteousnesse *of* Europe. At which speech hee bowed his Head, and went on in this manner. *They have also many wise and excellent Lawes touching* Marriage. *They allow no* Polygamie. *They have ordained that none doe intermarrie or contract, untill a Moneth be past from their first Inter-view.* Marriage *without consent of Parents they doe not make voyd, but they mulct it in the Inheritours: For the Children of such* Marriages, *are not admitted to inherit, above a third Part of their Parents Inheritance. I have read in a* Booke *of one of your* Men, *of a* Faigned Common-wealth, *where the Married Couple are permitted, before they Contract, to see one another Naked. This they dislike: For they thinke it a Scorne, to give a Refusall after so Familiar Knowledge: But because of many hidden Defects in Men and Womens Bodies, they have a more civill Way: For they have neare everie Towne, a Couple of* Pooles, (*which they call* Adam *and* Eves Pooles,) *where it is permitted to one of the Friends of the Man, and another of the Friends of the Woman, to see them severally bathe Naked.*

And as wee were thus in Conference, there came one that seemed to be a Messenger, in a rich Huke, that spake with the *Jew*: Whereupon hee turned to mee, and said; *You will pardon mee, for I am commanded away in haste.* The next Morning hee came to mee againe, joyfull as it seemed, and said; *There is word come to the Governour of the Citie, that one of the* Fathers *of* Salomons House, *will be here this day Seven-night: Wee have seene none of them this Dozen Yeares. His Comming is in State; But the Cause of his comming is secret. I will provide you, and your Fellowes, of a good*

Standing

Standing, to see his Entry. I thanked him, and told him; *I was most glad of the Newes.* The Day being come he made his Entry. He was a *Man* of Middle Stature, and Age, comely of Person, and had an Aspect as if he pitied Men. He was cloathed in a Roabe of fine blacke Cloth, with wide Sleeves, and a Cape. His under Garment was of excellent white Linnen, downe to the Foot, girt with a Girdle of the same; And a Sindon or Tippett of the same about his Necke. He had Gloves, that were curious, and sett with Stone; And Shoes of Peach-coloured Velvet. His Neck was bare to the Shoulders. His Hatt was like a Helmet, or *Spanish Montera*; And his Locks curled below it decently: They were of Colour browne. His Beard was cutt round, and of the same colour with his Haire, somewhat lighter. He was carried in a rich Chariott, without wheeles, Litter-wise; With two Horses at either end, richly trapped in blew Velvet Embroydered; and two Footmen on each side in the like Attire. The Chariot was all of Cedar, gilt, and adorned with Chrystall; Save that the Fore-end had Pannells of Sapphires, set in Borders of Gold; And the Hinder-end the like of Emerauds of the *Peru* Colour. There was also a Sunn of Gold, Radiant, upon the Topp, in the Midst; And on the Top before, a small *Cherub* of Gold, with Wings displayed. The Chariott was covered with Cloth of Gold tissued upon Blew. He had before him fifty Attendants, young Men all, in white *Satten* loose Coates to the Mid Legg; And Stockins of white Silk; And Shoes of blew Velvet; And Hatts of blew Velvett; with fine Plumes of diverse Colours, sett round like Hat-bands. Next before the Chariott, went two Men, bare-headed, in Linnen Garments downe to the Foot, girt, and Shoes of blew Velvett; Who carried, the one a Crosier, the other a Pastorall Staffe like a Sheephooke: Neither of them of Mettall, but the Crosier of Balme-wood, the Pastorall Staffe of Cedar. Horse-Men he had none, neither before, nor behinde his Chariott: As it seemeth to avoyd all Tumult and Trouble. Behinde his

his Chariot, went all the Officers and Principalls of the Companies of the Cittie. He ſate alone, upon Cuſhions, of a kinde of excellent Pluſh, blew; And under his Foote curious Carpetts of Silk of diverſe Colours, like the Perſian, but farre finer. He held up his bare Hand, as he went, as bleſſing the People, but in Silence. The Street was wonderfully well kept; So that there was never any Army had their Men ſtand in better Battell-Array, than the People ſtood. The Windowes likewiſe were not crouded, but every one ſtood in them, as if they had beene placed. When the ſhew was paſt, the *Jew* ſaid to me; *I ſhall not be able to attend you as I would, in regard of ſome charge the Citie hath lay'd vpon me, for the Entertaining of this Great Perſon.* Three dayes after the *Jew* came to mee againe, and ſaid; *Yee are happie men; for the* Father *of* Salomons Houſe *taketh knowledge of your Being here, and commanded me to tell you, that he will admit all your Company to his preſence, and have private Conference with one of you, that yee ſhall chooſe: And for this hath appointed the next day after to Morrow. And becauſe he meaneth to give you his Bleſſing, he hath appointed it in the Forenoone.* We came at our Day, and Houre, and I was choſen by my Fellowes for the private Acceſſe. We found him in a faire Chamber, richly hanged, and carpetted under Foote, without any Degrees to the State. He was ſett upon a Low Throne richly adorned, and a rich Cloth of State over his Head, of blew Sattin Embroydered. He was alone, ſave that he had two Pages of Honour, on either Hand one, finely attired in White. His Under Garments were the like that we ſaw him weare in the Chariott; but in ſtead of his Gowne, he had on him a Mantle with a Cape, of the ſame fine Blacke, faſtned about him. When wee came in, as wee were taught, we bowed Low at our firſt Entrance; And when wee were come neare his Chaire, he ſtood up, holding forth his Hand ungloved, and in Poſture of Bleſſing; And we every one of us ſtooped downe, and kiſſed the Hemme of his Tippett. That done, the reſt departed, and I remained.

Then

Then hee warned the Pages forth of the Roome, and caused mee to sit downe beside him, and spake to me thus in the *Spanish Tongue*.

GOD *blesse thee, my Sonne; I will give thee the greatest Jewell I have: For I will impart unto thee, for the love of* GOD *and Men, a Relation of the true State of* Salomons House. *Sonne, to make you know the true state of* Salomons House, *I will keepe this order. First I will set forth unto you the* End *of our* Foundation. *Secondly, the* Preparations *and* Instruments *wee have for our* Workes. *Thirdly, the severall* Employments *and* Functions *whereto our* Fellowes *are assigned. And fourthly, the* Ordinances *and* Rites *which wee observe.*

The End *of our* Foundation *is the Knowledge of* Causes, *and Secret Motions of Things; And the Enlarging of the bounds of* Humane Empire, *to the Effecting of all Things possible.*

The Preparations *and* Instruments *are these. We have large and deepe* Caves *of severall Depths: The deepest are sunke* 600. *Fathome: And some of them are digged and made under great Hills and Mountaines: So that if you reckon together the Depth of the Hill, and the Depth of the* Cave, *they are (some of them)*

above three Miles deepe. For we finde, that the Depth of a Hill, and the Depth of a Cave from the Flat, is the same Thing; Both remote alike, from the Sunne and Heavens Beames, and from the Open Aire. These Caves we call the Lower Region; And wee use them for all Coagulations, Indurations, Refrigerations, and Conservations of Bodies. We use them likewise for the Imitation of Naturall Mines; And the Producing also of New Artificiall Mettalls, by Compositions and Materials which we use, and lay there for many yeares. We use them also sometimes, (which may seeme strange,) for Curing of some Diseases, and for Prolongation of Life, in some Hermits that choose to live there, well accommodated of all things necessarie, and indeed live very long; By whom also we learne many things.

We have Burialls in severall Earths, where we put diverse Cements, as the Chineses doe their Porcellane. But we have them in greater Varietie, and some of them more fine. We have also great varietie of Composts, and Soiles, for the Making of the Earth Fruitfull.

We have High Towers; The Highest about halfe a Mile in Height; And some of them likewise set upon High Mountaines: So that the vantage of the Hill with the Tower, is in the highest of them three Miles at least. And these Places wee call the Upper Region; Accounting

ting the Aire between the High Places, and the Lowe, as a Middle Region. We use these Towers, according to their several Heights, and Situations, for Insolation, Refrigeration, Conservation; And for the View of divers Meteors; As Windes, Raine, Snow, Haile; And some of the Fiery Meteors also. And upon them, in some Places, are Dwellings of Hermits, whom we visit sometimes, and instruct what to observe.

We have great Lakes, both Salt, and Fresh; whereof we have use for the Fish, and Fowle. We use them also for Burialls of some Naturall Bodies: For we finde a Difference in Things buried in Earth, or in Aire below the Earth; and things buried in Water. We have also Pooles, of which some doe straine Fresh Water out of Salt; And others by Art doe turne Fresh Water into Salt. We have also some Rocks in the Midst of the Sea; And some Bayes upon the Shore for some Works, wherein is required the Aire and Vapour of the Sea. We have likewise Violent Streames and Cataracts, which serue us for many Motions: And likewise Engines for Multiplying and Enforcing of Windes, to set also on going diverse Motions.

We have also a Number of Artificiall Wels, and Fountaines, made in Imitation of the Naturall Sources and Baths; As tincted upon Vitriol, Sulphur, Steele, Brasse, Lead, Nitre, and other Mineralls. And againe we have little

Wells for Infusions of many Things, where the Waters take the Vertue quicker and better, than in Vessells, or Basins. And amongst them we have a Water, which we call Water of Paradise, being, by that we doe to it, made very Soveraigne for Health, and Prolongation of Life.

We have also Great and Spatious Houses, where we imitate and demonstrate Meteors; As Snow, Haile, Raine, some Artificiall Raines of Bodies, and not of Water, Thunders, Lightnings; Also Generations of Bodies in Aire; As Froggs, Flies, and diverse Others.

We have also certaine Chambers, which we call Chambers of Health, where we qualifie the Aire as we thinke good and proper for the Cure of diverse Diseases, & Preservation of Health.

Wee have also faire and large Baths, of severall Mixtures, for the Cure of Diseases, and the Restoring of Mans Body from Arefaction: And Others for the Confirming of it in Strength of Sinnewes, Vitall Parts, and the very Juyce and Substance of the Body.

We have also large and various Orchards, and Gardens; Wherein we doe not so much respect Beautie, as Varietie of Ground and Soyle, proper for diverse Trees, and Herbs: And some very spatious, where Trees, and Berries are set, whereof we make diverse Kinds of Drinks, besides the Vineyards. In these wee practise likewise all Conclusions of Grafting, and Inoculating, as well

well of Wild-Trees, as Fruit-Trees, which produceth many Effects. And we make (by Art) in the same Orchards, and Gardens, Trees and Flowers, to come earlier, or later, than their Seasons; And to come up and beare more speedily than by their Naturall Course they doe. We make them also by Art greater much than their Nature; And their Fruit greater, and sweeter, and of differing Taste, Smell, Colour, and Figure, from their Nature. And many of them we so Order as they become of Medicinall Use.

We have also Meanes to make diverse Plants, rise by Mixtures of Earths without Seeds; And likewise to make diverse New Plants, differing from the Vulgar; and to make one Tree or Plant turne into another.

Wee have also Parks, and Enclosures of all Sorts, of Beasts, and Birds; which we use not onely for View or Rareness, but likewise for Dissections, and Trialls; That thereby we may take light, what may be wrought upon the Body of Man. Wherein we find many strange Effects; As Continuing Life in them, though diverse Parts, which you account Vitall, be perished, and taken forth; Resuffitating of some that seeme Dead in Appearance; And the like. We try also all Poysons, and other Medicines upon them, as well of Chyrurgery, as Physicke. By Art likewise, we make them Greater, or Taller, than their Kinde is; And contrary-wise Dwarfe them and stay their Growth:

Growth: *Wee make them more* Fruitfull, *and* Bearing *than their* Kind *is*; *And contrary-wise* Barren *and not* Generative. *Also we make them differ in* Colour, Shape, Activity, *many wayes. Wee finde Meanes to make* Commixtures *and* Copulations *of diverse* Kinds; *which have produced many* New Kinds, *and them not* Barren, *as the generall Opinion is. Wee make a Number of* Kinds, *of* Serpents, Wormes, Flies, Fishes, *of* Putrefaction; *Whereof some are advanced (in effect) to be* Perfect Creatures, *like* Beasts, *or* Birds; *And have* Sexes, *and doe* Propagate. *Neither doe we this by* Chance, *but wee know before hand, of what* Matter *and* Commixture, *what* Kinde *of those* Creatures *will arise.*

Wee have also Particular Pooles, *where wee make* Trialls *upon* Fishes, *as we have said before of* Beasts, *and* Birds.

Wee have also Places *for* Breed *and* Generation *of those* Kindes *of* Wormes, *and* Flies, *which are of* Speciall Use; *Such as are with you your* Silk-wormes, *and* Bees.

I will not hold you long with recounting of our Brew-Houses, Bake-Houses, *and* Kitchins, *where are made diverse* Drinkes, Breads, *and* Meats, *Rare, and of speciall Effects.* Wines *we have of* Grapes; *And* Drinkes *of other* Juyce, *of* Fruits, *of* Graines, *and of* Roots; *And of* Mixtures *with* Honey, Sugar, Manna, *and* Fruits dryed, *and* decocted: *Also of the* Teares *or*

Woundings

Woundings, of Trees; And of the Pulp of Canes. And these Drinkes are of severall Ages, some to the Age or Last of forty yeares. We have Drinkes also brewed with severall Herbs, and Roots, & Spices; Yea with severall Fleshes, and White-Meates; Whereof some of the Drinkes are such, as they are in effect Meat and Drinke both: So that diverse, especially in Age, doe desire to live with them, with litle or no Meat, or Bread. And above all wee strive to have Drinkes of Extreame Thin Parts, to insinuate into the Body, and yet without all Biting, Sharpnesse, or Fretting; Insomuch as some of them, put upon the back of your Hand, will, with a little stay, passe through to the Palme, and yet taste Mild to the Mouth. We have also Waters, which we ripen in that fashion, as they become Nourishing; So that they are indeed excellent Drinke; And many will use no other. Breads wee have of severall Graines, Roots, and Kernels; Yea and some of Flesh, and Fish, Dryed; With diverse kindes of Leavenings, and Seasonings: So that some doe extreamely move Appetites; Some doe Nourish so, as diverse doe live of them, without any other Meate; Who live very long. So for Meates, we have some of them so beaten, and made tender, & mortified, yet without all Corrupting, as a Weake Heate of the Stomach will turne them into good Chylus; As well as a Strong Heat would Meat otherwise prepared. We have

some Meats also, and Breads, and Drinks, which taken by Men, enable them to Fast long after; And some other, that used make the very Flesh of Mens Bodies, sensibly, more Hard & Tough; And their Strength farre greater, than otherwise it would be.

We have Dispensatories, or Shops of Medicines. Wherein you may easily thinke, if wee have such Variety of Plants, and Living Creatures, more than you have in Europe, (for wee know what you have,) the Simples, Drugges, and Ingredients of Medicines, must likewise be in so much the greater Varietie. Wee have them likewise of diverse Ages, and long Fermentations. And for their Preparations, wee have not onely all Manner of Exquisite Distillations, and Separations, and especially by Gentle Heates, and Percolations through diverse Strainers, yea and Substances; But also Exact Formes of Composition, whereby they incorporate almost, as they were Naturall Simples.

We have also diverse Mechanicall Arts, which you have not; And Stuffes made by them; As Papers, Linnen, Silks, Tissues; dainty Workes of Feathers of wonderfull Lustre; excellent Dies, and many others: And Shops likewise, as well for such as are not brought into Vulgar use amongst us, as for those that are. For you must know, that of the Things before recited, many of them are growne into use throughout the Kingdome; But

yet,

yet, if they did flow from our Invention, we have of them also for Patternes and Principalls.

We have also Fournaces of great Diversities, and that keep great Diversitie of Heats: Fierce and Quicke; Strong and Constant; Soft and Milde; Blowne, Quiet, Dry, Moist; And the like. But above all wee have Heats, in Imitation of the Sunnes and Heavenly Bodies Heats, that passe diverse Inequalities, and (as it were) Orbs, Progresses, and Returnes, whereby we produce admirable effects. Besides wee have Heats of Dungs; and of Bellies and Mawes of Living Creatures, and of their Blouds, and Bodies; and of Hayes and Herbs layd up moist; of Lime unquenched; and such like. Instruments also which generate Heat onely by Motion. And further, Places for Strong Insolations; And againe, Places under the Earth, which by Nature, or Art, yeeld Heat. These diverse Heats we use, As the Nature of the Operation, which wee intend, requireth.

We have also Perspective-Houses, where we make Demonstrations of all Lights, & Radiations: And of all Colours: And out of Things uncoloured and Transparent, we can represent unto you all severall Colours; Not in Raine-Bowes, as it is in Gemms, and Prismes,) but of themselves Single. We represent also all Multiplications of Light, which we carry to great Distance, and make so Sharp, as to discerne small

Points *and* Lines. *Also all* Colourations *of* Light; *All* Delutions *and* Deceits *of the* Sight, *in* Figures, Magnitudes, Motions, Colours: *All* Demonstrations *of* Shadows. *We finde also diverse Means yet unknown to you, of* Producing *of* Light, *originally, from diverse* Bodies. *We procure meanes of Seeing* Objects a-far off; *As in the* Heaven, *&* Remote Places: *And represent* Things Neare *as* A-far off; *And* Things A-far off *as* Neare; *Making* Faigned Distances. *We have also* Helps *for the* Sight, *far above* Spectacles *&* Glasses *in use. We have also* Glasses *and* Meanes, *to see* Small *and* Minute Bodies; *perfectly and distinctly; As the* Shapes *and* Colours *of* Small Flies *&* Worms, Graines *&* Flawes *in* Gems *which cannot otherwise be seen,* Observations *in* Urine *and* Bloud, *not otherwise to be seene. We make* Artificiall Raine-Bowes, Halo's, *&* Circles *about* Light. *We represent also all manner of* Reflexions, Refractions, *&* Multiplications *of* Visuall Beames *of* Objects.

We have also Precious Stones *of all kinds, many of them of great Beauty, and to you unknowne:* Crystalls *likewise; And* Glasses *of diverse kinds; And amongst them some of* Mettals Vitrificated, *and other* Materialls, *besides those of which you make* Glasse. *Also a Number of* Fossiles, *and* Imperfect Minerals, *which you have not. Likewise* Loadstones *of Prodigious Vertue: And other rare* Stones, *both* Naturall, *&* Artificiall.

We

We have also Sound-Houses, *where we practise and demonstrate all* Sounds, *& their* Generation. *We have* Harmonies *which you have not, of* Quarter-Sounds, *and lesser* Slides *of* Sounds. *Diverse* Instruments *of* Musick *likewise to you unknowne, some* Sweeter *than any you have; Together with* Bells *and* Rings *that are dainty and sweet. Wee represent* Small Sounds *as* Great *and* Deepe; *Likewise* Great Sounds, Extenuate *and* Sharpe; *We make diverse* Tremblings *and* Warblings *of* Sounds, *which in their* Originall *are* Entire. *We represent and imitate all* Articulate Sounds *&* Letters, *and the* Voices *and* Notes *of* Beasts *and* Birds. *We have certain* Helps, *which set to the* Eare *doe further the* Hearing *greatly. We have also diverse* Strange *and* Artificiall Eccho's, Reflecting *the* Voice *many times, and as it were* Tossing *it: And some that give back the* Voice Lowder *than it came, some* Shriller, *and some* Deeper; *Yea some rendring the* Voice, Differing *in the* Letters *or* Articulate Sound, *from that they receive. Wee have also meanes to convey* Sounds *in* Trunks *and* Pipes, *in strange* Lines, *and* Distances.

We have also Perfume-Houses; *where with we joyne also* Practices *of* Taste. *Wee* Multiply Smells, *which may seeme strange. We* Imitate Smells, *making all* Smells *to breath out of other* Mixtures *than those that give them. Wee make diverse* Imitations *of* Taste *likewise, so that they*

will deceive any Mans Taſte. And in this Houſe we containe alſo a Confiture-Houſe, where wee make all Sweet-Meats, Dry and Moiſt; And diverſe pleaſant Wines, Milks, Broaths, and Sallets, farre in greater varietie, than you have.

We have alſo Engine-Houſes, where are prepared Engines and Inſtruments for all Sorts of Motions. There we imitate and practiſe to make Swifter Motions, than any you have, either out of your Musketts, or any Engine that you have: And to Make them, and Multiply them more Eaſily, and with Small Force, by Wheeles, and other Meanes: And to make them Stronger, and more Violent, than yours are; Exceeding your greateſt Cannons, and Baſilisks. We repreſent alſo Ordnance and Inſtruments of Warre, and Engines of all Kindes: And likewiſe New Mixtures and Compoſitions of Gun-Powder, Wild-Fires burning in Water, and Unquenchable. Alſo Fire-workes of all Varietie, both for Pleaſure, and Uſe. We imitate alſo Flights of Birds; We have ſome Degrees of Flying in the Aire. We have Ships and Boats for Going under Water, and Brooking of Seas; Alſo Swimming-Girdles and Supporters. We have diverſe curious Clocks; And other like Motions of Returne: And ſome Perpetuall Motions. Wee imitate alſo Motions of Living Creatures, by Images, of Men, Beaſts, Birds, Fiſhes, and Serpents. We have alſo a great

great Number of other various Motions, strange for Equalitie, Fineneſſe, and Subtiltie.

We have alſo a Mathematicall Houſe, where are repreſented all Inſtruments, as well of Geometry, as Aſtronomy, exquiſitely made.

Wee have alſo Houſes of Deceits of the Senſes; where wee repreſent all manner of Feats of Jugling, Falſe Apparitions, Impoſtures, and Illuſions; And their Fallaces. And ſurely you will eaſily beleeve, that we, that have ſo many Things truely Naturall, which induce Admiration, could in a World of Particulars deceive the Senſes, if we would diſguiſe thoſe Things, and labour to make them ſeeme more Miraculous. But wee doe hate all Impoſtures, and Lies: Inſomuch as we have ſeverely forbidden it to all our Fellowes, under paine of Ignominy and Fines, that they doe not ſhew any Naturall Worke or Thing, Adorned or Swelling; but onely Pure as it is, and without all Affectation of Strangeneſſe.

Theſe are (my Sonne) the Riches of Salomons Houſe.

For the ſeverall Employments and Offices of our Fellowes; We have Twelve that Sayle into Forraine Countries, under the Names of other Nations, (for our owne wee conceale;) Who bring us the Bookes, and Abſtracts, and Patternes of Experiments of all other Parts.

Theſe

These wee call Merchants of Light.

Wee have Three that Collect the Experiments which are in all Bookes. These wee call Depredatours.

Wee have Three that Collect the Experiments of all Mechanicall Arts; And also of Liberall Sciences; And also of Practises which are not Brought into Arts. These we call Mystery-Men.

We have Three that try New Experiments, such as themselves thinke good. These wee call Pioners or Miners.

We have Three that Draw the Experiments of the Former Foure into Titles, and Tables, to give the better light, for the drawing of Observations and Axiomes out of them. These we call Compilers.

We have Three that bend themselves, Looking into the Experiments of their Fellowes, and cast about how to draw out of them Things of Use, and Practice for Mans life, and Knowledge, as well for Workes, as for Plaine Demonstration of Causes, Meanes of Naturall Divinations, and the easie and cleare Discovery, of the Vertues and Parts of Bodies. These wee call Dowry-men or Benefactours.

Then after diverse Meetings and Consults of our whole Number, to consider of the former Labours & Collections, we have Three that take care, out of them, to Direct New Experiments,

of a Higher Light, more Penetrating into Nature than the Former. These we call Lamps.

We have Three others that doe Execute the Experiments so Directed, and Report them. These we call Inoculatours.

Lastly, we have Three that raise the former Discoveries by Experiments, into Greater Observations, Axiomes, and Aphorismes. These we call Interpreters of Nature.

Wee have also, as you must thinke, Novices and Apprentices, that the Succession of the former Employed Men doe not faile; Besides, a great Number of Servants and Attendants, Men and Women. And this we doe also: Wee have Consultations, which of the Inventions and Experiences, which wee have discovered, shall be Published, and which not: And take all an Oath of Secrecy, for the Concealing of those which wee thinke fit to keepe Secret: Though some of those wee doe reveale sometimes to the State, and some not.

For our Ordinances and Rites: Wee have two very Long, and Faire Galleries: In one of these wee place Patternes and Samples of all manner of the more Rare and Excellent Inventions: In the other wee place the Statua's of all Principall Inventours. There wee have the Statua of your Columbus, that discovered the

West-Indies: *Also the* Inventour *of* Shipps: *Your* Monke *that was the* Inventour *of* Ordnance, *and of* Gunpowder: *The* Inventour *of* Musick: *The* Inventour *of* Letters: *The* Inventour *of* Printing: *The* Inventour *of* Observations *of* Astronomy: *The* Inventour *of* Works *in* Mettall: *The* Inventour *of* Glasse: *The* Inventour *of* Silke *of the* Worme: *The* Inventour *of* Wine: *The* Inventour *of* Corne *and* Bread: *The* Inventour *of* Sugars: *And all these, by more certaine Tradition, than you have. Then have we diverse* Inventours *of our* Own, *of* Excellent Workes; *Which since you have not seene, it were too long to make* Descriptions *of them; And besides, in the right Understanding of those* Descriptions, *you might easily erre. For upon every* Invention *of Valew, wee erect a* Statua *to the* Inventour, *and give him a Liberall and Honourable* Reward. *These* Statua's *are, some of* Brasse; *some of* Marble *and* Touchstone; *some* of Cedar *and other speciall* Woods *guilt and adorned; some of* Iron; *some of* Silver; *some of* Gold.

Wee have certaine Hymnes *and* Services, *which we say daily, of* Laud & Thanks *to* God, *for his Marvellous* Works: *And* Formes *of* Prayers, *imploring his* Aide *and* Blessing, *for the* Illumination *of our* Labours, *and the* Turning *of them into* Good *and* Holy Uses.

Lastly, we have Circuits *or* Visits, *of diverse*

Principall

Principall Cities *of the* Kingdome; *where, as it commeth to passe, we doe publish such New* Profitable Inventions, *as we thinke good. And wee doe also declare* Naturall Divinations *of* Diseases, Plagues, Swarmes *of* Hurtful Creatures, Scarcitie, Tempests, Earth-quakes, Great Inundations, Comets, Temperature *of the* Yeare, *and diverse other Things; And we give* Counsell *thereupon, what the* People *shall doe, for the* Prevention *and* Remedy *of them.*

And when Hee had sayd this, Hee stood up: And I, as I had beene taught, kneeled downe, and He layd his Right Hand upon my Head, and said; GOD *blesse thee, my Sonne; And* GOD *blesse this Relation, which I have made. I give thee leave to Publish it, for the Good of other Nations; For wee here are in* GODS *Bosome, a Land unknowne.* And so hee left mee; Having assigned a Valew of about two Thousand Duckets, for a Bountie to mee and my Fellowes. For they give great Largesses, where they come, upon all occasions.

The rest was not Perfected.

MAGNALIA NATVRÆ, PRÆCIPUE QUOAD USUS HUMANOS.

THe Prolongation of Life.
The Reſtitution of Youth in ſome Degree.
The Retardation of Age.
The Curing of Diſeaſes counted Incurable.
The Mitigation of Paine.
More Eaſie and leſſe Loathſome Purgings.
The Increaſing of Strength and Activitie.
The Increaſing of Ability to ſuffer Torture or Paine.
The Altering of Complexions: And Fatneſſe, and Leanneſſe.
The Altering of Statures.
The Altering of Features.
The Increaſing and Exalting of the Intellectuall Parts.
Verſions of Bodies into other Bodies.
Making of New Species.

Transplanting *of one* Species *into another.*
Instruments *of* Destruction, *as of* Warre, *and* Poyson.
Exhilaration *of the* Spirits, *and* Putting *them in good* Disposition.
Force *of the* Imagination, *either upon another* Body, *or upon the* Body *it selfe.*
Acceleration *of* Time *in* Maturations.
Acceleration *of* Time *in* Clarifications.
Acceleration *of* Putrefaction.
Acceleration *of* Decoction.
Acceleration *of* Germination.
Making Rich Composts *for the* Earth.
Impressions *of the* Aire, *and* Raising *of* Tempests.
Great Alteration; *As in* Induration, Emollition, &c.
Turning Crude *and* Watry Substances *into* Oyly *and* Unctious Substances.
Drawing of New Foods *out of* Substances *not now in* Use.
Making New Threds *for* Apparell; *And* New Stuffes; *Such as are* Paper, Glasse, &c.
Naturall Divinations.
Deceptions *of the* Senses.
Greater Pleasures *of the* Senses.
Artificiall Mineralls *and* Cements.

FINIS.